THE

AMERICAN GAS-LIGHT JOURNAL.

THE OFFICIAL GAZETTE OF

LIGHT, HEAT, WATER-SUPPLY, AND SEWERAGE.

Rooms—No. 39 Nassau Street, cor. Liberty Street, opposite the Post-Office, New York.

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Samples of the above castings can be seen at the Rooms of the AMERICAN GAS-LIGHT JOURNAL.

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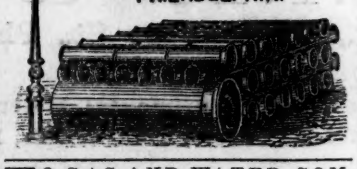

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THOMAS GLOVER'S Meters have now been in use in the United States and British Provinces, for the last FOURTEEN YEARS, and are extensively used by many Gas Companies, to their entire satisfaction; and R. GLOVER can with all confidence refer to them in proof that THOMAS GLOVER'S Meters are— the most PERFECT in PRINCIPLES— the most CORRECT in REGISTRATION—and more DURABLE than any other Dry Gas Meter made in the United States or Great Britain. R. GLOVER will at all times be glad to repair any Gas Meters sent him at the above factory. If any of them are of THOMAS GLOVER'S manufacture, and of a more recent date than THREE years, he will make no charge.

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ALSO, BUNSEN'S PHOTOMETER, WITH COMPLETE APPARATUS FO WORKING THE SAME

* The standard of measurement of this Gas-Holder is given by Professors TORREY, of the U. S. Assay Office; JOY, of Columbia College; GIBBS, of the Free Academy, and several other distinguished scientific gentlemen.

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METERS REPAIRED AND FORWARDED WITH DISPATCH.

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Bartonsville, Harrellsville, Murfreesboro', Pitch Landing, Saint John, Winton.

Hyde County.

Enterprise, Fairfield, Hatteras, Lake Comfort, Lake Landing, Middletown, Ocracoke, Sladesville, *Swan Quarter*, (c. h.) Wysoking.

Iredell County.

Amity Hill, Belt's Bridge, Bethany Church, Boyden, Chesnut Grove, Cool Spring, Deep Well, Eagle Mills, Enola, Fallstown, Fancy Hill, Granite Hill, Houstonville, Liberty Hill, Mount Mourne, New Hope, New Stirling, Olin, Oak Forest, Snow Creek, *Statesville*, (c. h.,) Sweet Home, Tulin, Turnersburgh, Union Grove, Williamsburgh.

Jackson County.

Cashers Valley, East Laport, Georgetown, Heady Mountain, High Top, Hogback Valley, Horse Cove, Webster,

Johnson County.

Bentonsville, Beulah, Boonhill, Clayton, Creachville, Earpsborough, Elevation, Lowell, Pine Level, Saint Charles, Sandy Level, *Smithfield*, (c. h.)

Jones County.

Comfort, Pollocksville, *Trenton*, (c. h.)

Lenoir County.

Kinston, (c. h.,) Lenoir Institute, Moseley Hall, Pink Hill, Sandy Foundation, Strabane.

Lincoln County.

Beattie's Ford, Catawba Springs, Chronicle, Cottage Home, Dry Ponds, Early Grove, Killian's Mills, Lantz Grove, *Lincolnton*, (c. h.,) Lowrance's Mill, Sherrill's Ford, Siegel's Store, Spring Hill Forge, Vesuvius Furnace.

Macon County.

Cowee, Forks of Tennessee, Franklin, Governor's Island, Nantihala, Niyohih, Skeeneh, Tennessee River.

Madison County.

Big Laurel, Clay, Cross Rock, Gabriel's Creek, Ivy Bend, Ivy Gap, Jewell Hill, Lapland, Marshall, Raysville, Spring Creek, Walnut Mountain, White Rock.

Martin County.

Hamilton, Jamesville, Williamston.

McDowell County.

Black Mountain, Cain's Branch, Dysortville, *Marion*, (c. h.,) Minersville, North Cove, Old Fort, Stone Mountain, Sugar Hill, Turkey Cove.

(To be Concluded.)

CARBONIC OXIDE A CAUSE OF MALARIA.—An important discovery, in connection with sanitary science, and with physical geography, has been made by the illustrious agricultural chemist, Boussingault. He lately read before the Academy of Sciences a paper, in which he demonstrated, with remarkable precision, that oxide of carbon accompanies the liberated oxygen, whenever the sun shines upon a vegetable submerged in water impregnated with carbonic acid. The presence of so deleterious a gas as carbonic oxide in the atmosphere of marshy countries, is manifested by this discovery, and it explains the fatal attacks which animals suffer in the health when exposed to the influence of marshy exhalations. On the other hand, it is maintained, that in large cities where coal is consumed, as in Paris and London, carbonic oxide is much more abundant in the atmosphere than it is in the most unhealthy marshy situations, and yet marsh fevers do not prevail in those cities. This has led to the conclusion that the cause of marsh fevers is due to a solid organic body, a microscopic insect, or the *débris* of an insect carried through, and penetrating the air-passages of the lungs, and acting like a putrid foreign body which vitiates the whole mass of the blood in the animal by a process of putrefactive fermentation.—*Scientific American.*

DISCOVERY BY SPECTRAL ANALYSIS.—It was formerly believed that the blue flame of a candle, alcohol, illuminating gas, paper, &c., was caused by the burning of carbonic oxide. M. Moren, who has recently written a letter to the editor of *Cosmos*, says it is owing to the protocarbide of hydrogen. This has been proved by spectral analysis.

PETROLEUM TRADE.—It is stated that 8,000 barrels, of about 40 gallons each, of the oil from the Pennsylvania oil wells, have been recently shipped to London. This is the first large shipment to England.

HISTORY OF BALLOONING.

(*Continued from page 90, vol. 2, of this* JOURNAL.)

CHAPTER IV.

We have recorded the successful experiment of the first hydrogen balloon, and the desire for aerial voyages was now raised to concert pitch. M. Charles and the two Messrs. Roberts resolved to undertake an aerial excursion with a balloon filled with hydrogen gas. One authority, Professor Wise, whose pertinacity in developing this interesting science deserves all praise, is a worthy successor of these enterpising men, and it is only to be regretted that the want of means is now deterring Professor Wise from a complete explanation of the upper regions, the hidden secrets of which sphere would, we are sure, if revealed, be of more practical value to us to-day, and to mankind forever, than the ice-bound records of the entire Arctic regions.

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But to return. A balloon was accordingly prepared by the Messrs. Roberts, of varnished silk. It was of a spherical form, twenty-seven feet in diameter, and had a car suspended from it for the accommodation of the adventurers. To prevent any danger from the expansion of the gas under a diminished pressure of the atmosphere in the upper regions, the balloon was furnished with a valve, formed in such a manner as to permit the free discharge of gas when occasion required. Thus, on the 17th of December, 1783, M. Charles, and one of the Roberts, having previously ascertained the direction of the wind by launching a small balloon, ascended from Paris to the height of 6,000 feet; and, after a voyage of an hour and three-quarters, descended at a distance of twenty-seven miles from the place of their departure. After their descent, M. Roberts got out of the car, which lightened the vessel about 130 pounds, which enabled M. Charles to re-ascend; and in twenty minutes he attained an elevation of 9,000 feet above the surface of the earth. At this immense height, he says, all terrestrial objects totally disappeared from his view. The thermometer stood at 47 degrees when he left the earth, but in the space of ten minutes it fell to 21 degrees. The effects which so rapid a change of situation produced upon him were violent in the extreme; he was benumed with cold, and felt a severe pain in his right ear and jaw. The balloon passed through different currents of air, and in the higher regions the expansion of the gas was so powerful, that M. Charles was obliged to allow part of it to escape in order to prevent the bursting of the balloon. After having risen to the height of 10,500 feet, he came down about a league from the place where he let his companion out of the car. The balloon, including the two aeronauts, thermometer, barometer, and ballast, weighed 640 pounds, and the hydrogen gas was found, on calculation, to be about five and one-quarter times lighter than common air.

Jean Pierre Blanchard, an ingenious Frenchman, who had spent a great deal of time in trying to perfect a mechanical contrivance by which he might be enabled to fly, was the next to construct a balloon upon the hydrogen gas plan. This was also twenty-seven feet in diameter. He ascended from Paris on the 2d of March, 1784, accompanied by a Benedictine friar. After rising fifteen feet, the balloon was precipitated to the ground with a violent shock, upon which, the friar, apprehensive of his safety, was induced to abandon his seat. M. Blanchard then ascended alone, and attained a height of 9,600 feet. He met with various currents of air. He suffered from extreme cold, and became oppressed with drowsiness, and finally descended, after a voyage of an hour and a quarter. In order to direct his course, he used, on this occasion, an apparatus consisting of a rudder and two wings, which were attached to his car, but found that it exerted little or no influence over the balloon, either in this or in subsequent voyages.

In April, 1784, MM. Morveau and Bertrand adopted a similar expedient, which they found to operate very sensibly on the direction of their balloon. They rose about 13,000 feet high, where they enjoyed one of the most sublime and magnificent prospects that the imagination could conceive. The mass of clouds that floated in silent disorder through the regions below them, presented the appearance of a serene and boundless ocean, while a beautiful parhelion of concentric circles, that began to form as the sun went down, heightened the grandeur of the scene. In the month of June following, M. de Morveau undertook another voyage, which, as well as the former, commenced at Dijon. His balloon was twenty-five feet in diameter, and made of varnished taffeta.

A similar device for regulating the course of the balloon was resorted to by the Messrs. Roberts, who had before ascended together. Their former balloon was converted into an oblong spheroid, forty-six feet by twenty-seven, the longer axis being parallel to the horizon, and the car, which was seventeen feet long, had five wings or oars disposed around it, for the purpose of steering. The Messrs. Roberts, and M. Colin Hullin, upon entering the car of this machine, threw out twenty-four pounds of ballast, which produced a gentle ascent. The current of air between the altitudes of 600 and 4,200 feet was uniform. On arriving at the height of 14,000 feet, they encountred some stormy clouds, which they endeavored to avoid, by alternately ascending and descending. In three hours from their ascent, they heard two peals of thunder, when the thermometer fell from seventy-seven to fifty-nine degrees. Finding themselves, soon afterwards, becalmed, they had recourse to their oars, by the exertion of which, their balloon, in thirty-five minutes, described an elliptical segment, whose shortest diameter was 6,000 feet. After traveling 150 miles, in the space of six hours and a half, they descended in safety.

The Messrs. Roberts, accompanied by the Duke of Orleans, and a fourth person, ascended in July, 1784, in a balloon different in its structure from any that had heretofore been tried. On all former occasions, aeronauts had found the method of effecting a descent by the discharge of gas, attended with inconvenience, and to obviate this difficulty, the Messrs. Roberts had suspended a small balloon within the large one. This interior balloon was to be filled with common air, by means of bellows attached to it by tubes, whenever they wished to descend, it being justly supposed, that the addition of common air would increase the weight, as its dimunition would, on the other hand, lighten the balloon. This expedient, however, though promising in theory, did not answer in practice. In the space of three minutes, they rose to a height where not an object was to be seen but the clouds that surrounded them. The balloon, no longer obeying their management, was tossed, with the most violent agitation, as if from one whirlwind to another. The cords, by which the interior balloon was suspended, giving way, it fell down in such a position as completely to close up the aperture which communicated between the large balloon and the car. A sudden gust of wind next drove them beyond the region of the storm; but the expansion of the hydrogen within the vessel increasing, they dreaded the bursting of the balloon, and, being unable to remove the small one, which now obstructed the aperture, they continued to ascend. It finally gave way in two places, and, notwithstanding the imminent danger to which they were exposed, from the rapidity of its descent caused by this accident, they all landed without being hurt.

Though several experiments on the ascensive power of balloons had been made in England, during the course of the year after their discovery, the first aerial voyage, which was undertaken by Vincent Lunardi, an Italian, did not take place till September, 1784. His balloon was thirty-three feet in diameter, and shaped like a pear. It was made of oiled silk, with alternate stripes of blue and red, having the car suspended from a hoop below the balloon, by forty-five cords.

FIRST AERIAL VOYAGE ACROSS THE SEA.

The most remarkable aerial voyage that was made soon after the discovery of acrostatic machinery, was accomplished by M. Blanchard, in company with Dr. Jeffries, an American physician, who was at the time residing in England. On the 7th of January, 1785, in a clear frosty day, the balloon was launched from the cliff of Dover, and, after a somewhat perilous adventure, they crossed the Channel in something less than three hours. The balloon, after its release, rose slowly and majestically in the air; they passed over several ships, and enjoyed a grand prospect of the numerous objects below them. They soon, however, found themselves beginning to descend, which put them to the necessity of throwing over half their ballast, when they were about one-third way across the Channel. When they got about half way across, they found themselves descending again, upon which, they threw over the balance of their sand; also some books they had with them. All this failed to overcome the gravitating power of the balloon. They next commenced throwing overboard their apparatus—cords—grapples, and bottles. An empty bottle seemed to emit smoke as it descended, and, when it struck the water, the shock of the concussion was sensibly felt by the aeronauts. Still, their machine continued to descend, when they next betook themselves to trowing off their clothing; but, having now nearly reached the French coast, the balloon began to ascend again, and rose to a considerable height, without compelling them to dispense with much of their apparel. They passed over the highlands between Cape Blanc and Calais, and landed near the edge of the forest of Guiennes, not far beyond Calais. The magistrates of the town treated the aerial travelers with the utmost kindness and hospitality. The King of France made M. Blanchard a present of 12,000 livres, as a token of appreciation of the aeronaut's perseverance and skill, in the newly-discovered art.

Several hundred ascensions had now already been made, and not a single fatal accident had yet taken place; but we are now compelled to record one which proved most disastrous to its projectors, and when we fairly estimate its design, it seems as though it could hardly have terminated otherwise. Pilatre de Rozier and M. Romain were anxious to return the compliment of M. Blanchard and Dr. Jeffries, by crossing over the Channel from France to England. For the purpose of avoiding the difficulty which attended Blanchard's balloon in keeping her up, they constructed a compound balloon. This was arranged by suspending a fire balloon underneath the hydrogen balloon. The fire balloon was intended to regulate the rising and falling of the whole machine. The hydrogen balloon was of a globular shape, forty feet in diameter; the other was about ten feet in diameter. After various delays, occasioned by adverse winds, he, in company with M. Romain, set out from Boulogne, on the 15th of June, 1785. Scarcely a quarter of an hour had elapsed, when, at the height of about 3,000 feet, the whole apparatus was discovered to be on fire. Its scattered fragments, with the unfortunate bodies of the the aeronauts, fell to the ground near the sea shore, about four miles from Boulogne. They were instantly killed by the tremendous crash, and their bodies were of course awfully mangled.

TESTU'S REMARKABLE VOYAGE.

"On the 18th of June, 1785, M. Testu ascended from Paris. His balloon was twenty-nine feet in diameter, constructed by himself, of glazed tiffeta, furnished with auxiliary wings, and filled, as had now become the fashion, with hydrogen gas. It had been much injured by wind and rain during the night before its ascension; but, having undergone a slight repair, it was finally launched, with its conductor, at four o'clock in the afternoon. The barometer then stood 29.68 inches, and the thermometer as high as eighty-four degrees, though the day was cloudy and threatened rain. The balloon had at first been filled only five-sixths; but it gradually swelled as it become drier and warmer, and acquired its utmost distension at the height of 2,800 feet. But to avoid the waste of gas or the rupture of the balloon, the navigator calculated to descend by the reaction of his wings. Though this force had little efficacy, yet at half-past five o'clock he softly alighted in a corn-field in the plain of Montmorency. Without leaving the car he began to collect a few stones for

ballast, when he was surrounded by the proprietor of the corn and a troop of peasants, who insisted on being indemnified for the damage occasioned by his idle and curious visitors. Anxious now to disengage himself, he persuaded them that, his wings being broken, he was wholly at their mercy. They seized the stay of the balloon, which floated at some height, and dragged their prisoner through the air in a sort of triumph towards the village. But M. Testu, finding that the loss of his wings, his cloak, and some other articles, had considerably lightened the machine, suddenly cut the cord, and took an abrupt leave of the clamorous and mortified peasants. He rose to the region of the clouds, where he observed small frozen particles floating in the atmosphere. He heard thunder rolling beneath his feet, and as the coolness of the evening advanced, the buoyant power of his vessel diminished, and at three quarters after six o'clock, he approached the ground with his car near the Abbey of Royaumont. There he threw out some ballast, and in the space of twelve minutes rose to a height of 2,400 feet, where the thermometer stood only at sixty-six degrees. He now heard the blast of a horn, and descried some huntsmen below in full chase. Curious to witness the sport, he pulled the valve and descended at eight o'clock, between Etouen and Varville, when, rejecting his oars, he set himself to gather some ballast. While he was thus occupied, the hunters galloped up to him. He then mounted a third time, and passed through a dense body of clouds, in which thunder followed lightning in quick succession.

> 'With fresh alacrity and force renewed,
> Springs upward, like a pyramid of fire,
> Into the wild expanse, and through the shock
> Of fighting elements, on all sides round
> Environed wins his way.'

"The thermometer fell to twenty-one, but afterwards regained its former point of sixty-six degrees, when the balloon had reached an altitude of 3,000 feet. In this region, the voyager sailed till half-past nine o'clock, at which time he observed from his 'watch-tower in the sky' the final setting of the sun. He was now quickly involved in darkness, and enveloped in the thickest mass of thunder clouds. The lightnings flashed on all sides, and the loud claps were incessant. The thermometer, seen by the help of a phosphoric light with which he had provided himself, stood at twenty-one degrees, and snow and sleet fell copiously around him. In this most tremendous situation, the intrepid adventurer remained the space of three hours, the time during which the storm lasted. The balloon was affected by a sort of undulating motion upwards and downwards, owing, he thought, to the electrical action of the clouds.* The lightning appeared excessively vivid; but the thunder was sharp and loud, preceded by a sort of crackling noise. A calm at last succeeding, he had the pleasure to see the stars, and embraced this opportunity to take some necessary refreshments. At half-past two o'clock the day broke in; but his ballast being nearly gone, he finally descended a quarter before four o'clock, near the village of Campremi, about sixty-three miles from Paris."

THE PARACHUTE.

As the chief danger in the early practice of balloon voyages consisted in accidental and rapid descents, the parachute was introduced to countervail this danger, and which would also enable the aerial voyager, in case of alarm, to desert his balloon in mid-air, and drop, without sustaining injury, to the ground. The meaning of the French word *parachute* is literally a guard against falling, *parapluie* (an umbrella) is a guard against rain, and *parasol*, a guard against the sun. The parachute resembles a large umbrella, and has been used from remote ages in the east by vaulters in jumping from great heights.

FRENCH AEROSTATIC INSTITUTE.

In the early part of the French revolutionary war, an aeronautic school was established at Mendon, near Paris, to instruct pupils in the art of *reconnoisance*. It was got up with the greatest secresy, so that the allied Powers should not avail themselves of its advantages until the projectors had used it first, effectually. We pass over the aerial voyages of Gay Lussac and Biot, after the capitulation of Cairo, when the French army had returned from the African deserts; of Mosment, Garnerin, and extract from the *Encyclopædia Britannica*, the following interesting calculations of the mathematical buoyancy and expansion of balloons.

The Buoyant Force of Balloons.—Since balloons in their shape generally approach to the spherical form, it will be more convenient to ground our calculations on that figure. A globe one foot in diameter of common air at the level of the sea, and of the mean density and temperature, is found to weigh about the twenty-fifth part of a pound avoirdupois. Consequently, if a perfect vacuum could be procured, a balloon of ten feet diameter must rise with a force of forty pounds; one of twenty feet diameter with that of 320 pounds; and a balloon of thirty feet diameter would mount in the atmosphere with the power of 1,080 pounds, thus augmenting always in the ratio of the cube of the diameter. But air expands by heat about the 450th part of its bulk for each degree on Fahrenheit's scale; supposing, therefore, that the air included within the balloon were heated fifty degrees, it would follow that one-ninth part of this fluid would be driven out of it by the warmth, and consequently, that the tendency of the balloon to rise upwards would be equal only to the ninth part of the entire power of ascension. Were it possible to maintain a heat of seventy-five degrees within the balloon, the buoyant force would yet not exceed the sixth part of the absolute ascensional power.

The dilatation which the presence of humidity communicates to air will, during fine weather in this climate, amount generally to one-eighteenth part, though it may sometimes reach to more than the double of this quantity. But in the tropical regions, such dilatation will commonly exceed the twentieth part of the volume of fluid. Hence moist air thrown into a bag, likewise wetted, and sufficiently large, would cause it to rise in the atmosphere. To succeed, however, in this way, the balloon constructed of coarse linen would require enormous dimensions, not less than three hundred feet in diameter.

But it is the union of heat and moisture that gives to air the greatest expansion. The white smoke with which the balloons are filled on the Montgolfiers' plan, was found by computation to be at least one-third specifically lighter than the external air. This purer sort of smoke is scarcely anything but air itself charged with vapor, being produced by the burning of chopped straw and vine twigs in a brasier, under the orifice of the ballon. It would have required no fewer than 150° of heat alone to cause the same extent of rarefaction.

We have, therefore, sufficient data for calculating the buoyant force of the common fire, or smoke balloons. This force being estimated about twelve and a half pounds avoirdupois, when the diameter of the balloon is ten feet, would amount to 1,562½ pounds, if the diameter were fifty feet, and to 12,500 pounds if it were 100 feet. The weight of the linen case may be reckoned at two-fifths of a pound for a sphere of one foot in diameter. Consequently, a balloon of ten feet diameter would, without its appendages, weigh forty pounds; one of fifty feet diameter, 1,000 pounds; and one of a hundred feet diameter, 4,000 pounds. Such a balloon of ten feet in diameter would need twenty-seven and a half pounds to make it rise; but one of fifty feet diameter would ascend with a force of 562½ pounds, and one of a hundred feet diameter would exert an ascending power of not less than 8,500 pounds. There is besides to be deducted the weight of the cordage, the car, the ballast, and the passengers. It would require, on these estimates, a diameter of thirty-three and a half feet, to procure merely an equilibrium between the weight of the canvas and the buoyant force of the rarified air.

The hydrogen gas obtained from the action of dilute sulphuric acid upon iron filings is only six times lighter than atmospheric air; but the gas evolved during the solution of zinc in that acid, is not less than twelve times lighter than common air. The ordinary way of examining the specific gravity of the different gases requires a very nice operation—weighing with the most exquisite balance; a serious difficulty, which long retarded our knowledge of their comparative densities. In one of the notes to his "Treatise on Heat," Professor Leslie has pointed out a very simple method, founded on the principles of pneumatics, for discovering the relative specific gravities of the aeriform fluids. This consists in observing the time that a given portion of the gas, under a determinate pressure, takes to escape through a very small aperture. The density of the gaseous fluid must be inversely as the square of the interval elasped. Thus, the hydrogen gas procured from zinc, but without any depuration, was found, under the pressure of the same column of water, to flow thrice as fast as atmospheric air. This experiment is very striking, and requires no more apparatus than a cylindrical jar, open below and surmounted by a cap terminating in a fine tubular orifice.

On a very moderate supposition, therefore, and after making every allowance for imperfect operation, we may consider the hydrogen gas which fills a balloon as six times lighter than an equal bulk of common air. Consequently, such a balloon must exert five-sixths of the whole buoyant force corresponding to its capacity, or will have a tendency to mount in the atmosphere, that is equal to the thirtieth part of a pound avoirdupois for a globe of one foot in diameter. A spherical balloon of fifteen feet diameter would hence have a buoyancy of 112½ pounds; one of thirty feet, 900 pounds; and one of sixty feet no less than 7,200 pounds. Here follows an estimate of the weight of the silk used in balloons, which of course is to be deducted from the above ascensional powers, but which is much lighter than the silk I would recommend for such purposes. It is, therefore, omitted, as the aeronaut can make that calculation best from the balloon actually in use.

But the calculations now given would in strictness require a small modification. The weight of the envelop and all appendages must evidently compress the included gas, and thereby render it in some degree denser. To compute this minute effect, we have only to consider that the pressure of a column of atmosphere, at the mean temperature, and near the level of the sea, is 1,632 pounds, on a circle of a foot diameter. Thus, in the balloon of sixty feet diameter, if we suppose the whole load to have been 6,000 pounds, the compression of the bag would only amount to five-thirds of a pound for each circle of a foot diameter in the horizontal section, or correspond to the 979th part of the entire pressure of the atmosphere. But the weight of the confined gas being 1,200 pounds, its buoyancy must have suffered a diminution of somewhat more than a pound, or one-eleventh from the incumberance opposed to it.

PENNINGTON'S FLYING MACHINE.

Various individuals have attempted to navigate the air with machines entirely independent of balloons, and although no marked success has attended their experiments, still they deserve, on account of their ingenuity, a passing notice.

The first of these was the flying machine of John H. Pennington, of Baltimore, Md., whose description of it was as follows:

"The principle is the lateral pressure of the atmosphere, acting upon the inclined plane, the propelling power and wheel. The machine or inclined plane will resemble in figure the transverse section of a spheroid, in either side of which are openings for the purpose of admitting a pair of beveled wheels, by which the machine is to be propelled; and centrally situated between these is a small engine, by which the wheels are to be put in motion, by a chain band connected with the engine. It is proposed to have the engine made of steel, so as to secure the greatest possible strength in the smallest possible compass—and to use spirits of turpentine or alcohol, which boil at about thirty-three and a half per cent. less heat than water; when 300 per cent. of strength may be obtained by using these materials, and the same proportionate weight of metal being dispensed with, which being calculated to work two and a half or three horse power—and to carry 450 lbs. exclusively of weight of engine, fuel, and dilating fluid, averaging 500 lbs. more. This would make a total of 950 lbs., which would require an extent in width of about 125 feet by 375. This, multiplied by itself, and one-third of the quotient deducted, would leave the number of square feet contained in the area of the disc of the inclined plane of the machine.

"The wheels, which are intended to propel the plane forward, are spiral or bevel-winged, situated in open-

* It is caused by the uprising current of air which always prevails in thunder-storms. This would drive his balloon up to the top of the clouds, from whence it would fall into the vortex below again.

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(*Continued from page 90, col. 2, of this* JOURNAL.)

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Jean Pierre Blanchard, an ingenious Frenchman, who had spent a great deal of time in trying to perfect a mechanical contrivance by which he might be enabled to fly, was the next to construct a balloon upon the hydrogen gas plan. This was also twenty-seven feet in diameter. He ascended from Paris on the 2d of March, 1784, accompanied by a Benedictine friar. After rising fifteen feet, the balloon was precipitated to the ground with a violent shock, upon which, the friar, apprehensive of his safety, was induced to abandon his seat. M. Blanchard then ascended alone, and attained a height of 9,600 feet. He met with various currents of air. He suffered from extreme cold, and became oppressed with drowsiness, and finally descended, after a voyage of an hour and a quarter. In order to direct his course, he used, on this occasion, an apparatus consisting of a rudder and two wings, which were attached to his car, but found that it exerted little or no influence over the balloon, either in this or in subsequent voyages.

In April, 1784, MM. Morveau and Bertrand adopted a similar expedient, which they found to operate very sensibly on the direction of their balloon. They rose about 13,000 feet high, where they enjoyed one of the most sublime and magnificent prospects that the imagination could conceive. The mass of clouds that floated in silent disorder through the regions below them, presented the appearance of a serene and boundless ocean, while a beautiful parhelion of concentric circles, that began to form as the sun went down, heightened the grandeur of the scene. In the month of June following, M. de Morveau undertook another voyage, which, as well as the former, commenced at Dijon. His balloon was twenty-five feet in diameter, and made of varnished taffeta.

A similar device for regulating the course of the balloon was resorted to by the Messrs. Roberts, who had before ascended together. Their former balloon was converted into an oblong spheroid, forty-six feet by twenty-seven, the longer axis being parallel to the horizon, and the car, which was seventeen feet long, had five wings or oars disposed around it, for the purpose of steering. The Messrs. Roberts, and M. Colin Hullin, upon entering the car of this machine, threw out twenty-four pounds of ballast, which produced a gentle ascent. The current of air between the altitudes of 600 and 4,200 feet was uniform. On arriving at the height of 14,000 feet, they encountred some stormy clouds, which they endeavored to avoid, by alternately ascending and descending. In three hours from their ascent, they heard two peals of thunder, when the thermometer fell from seventy-seven to fifty-nine degrees. Finding themselves, soon afterwards, becalmed, they had recourse to their oars, by the exertion of which, their balloon, in thirty-five minutes, described an elliptical segment, whose shortest diameter was 6,000 feet. After traveling 150 miles, in the space of six hours and a half, they descended in safety.

The Messrs. Roberts, accompanied by the Duke of Orleans, and a fourth person, ascended in July, 1784, in a balloon different in its structure from any that had heretofore been tried. On all former occasions, aeronauts had found the method of effecting a descent by the discharge of gas, attended with inconvenience, and to obviate this difficulty, the Messrs. Roberts had suspended a small balloon within the large one. This interior balloon was to be filled with common air, by means of bellows attached to it by tubes, whenever they wished to descend, it being justly supposed, that the addition of common air would increase the weight, as its dimunition would, on the other hand, lighten the balloon. This expedient, however, though promising in theory, did not answer in practice. In the space of three minutes, they rose to a height where not an object was to be seen but the clouds that surrounded them. The balloon, no longer obeying their management, was tossed, with the most violent agitation, as if from one whirlwind to another. The cords, by which the interior balloon was suspended, giving way, it fell down in such a position as completely to close up the aperture which communicated between the large balloon and the car. A sudden gust of wind next drove them beyond the region of the storm; but the expansion of the hydrogen within the vessel increasing, they dreaded the bursting of the balloon, and, being unable to remove the small one, which now obstructed the aperture, they continued to ascend. It finally gave way in two places, and, notwithstanding the imminent danger to which they were exposed, from the rapidity of its descent caused by this accident, they all landed without being hurt.

Though several experiments on the ascensive power of balloons had been made in England, during the course of the year after their discovery, the first aerial voyage, which was undertaken by Vincent Lunardi, an Italian, did not take place till September, 1784. His balloon was thirty-three feet in diameter, and shaped like a pear. It was made of oiled silk, with alternate stripes of blue and red, having the car suspended from a hoop below the balloon, by forty-five cords.

FIRST AERIAL VOYAGE ACROSS THE SEA.

The most remarkable aerial voyage that was made soon after the discovery of acrostatic machinery, was accomplished by M. Blanchard, in company with Dr. Jeffries, an American physician, who was at the time residing in England. On the 7th of January, 1785, in a clear frosty day, the balloon was launched from the cliff of Dover, and, after a somewhat perilous adventure, they crossed the Channel in something less than three hours. The balloon, after its release, rose slowly and majestically in the air; they passed over several ships, and enjoyed a grand prospect of the numerous objects below them. They soon, however, found themselves beginning to descend, which put them to the necessity of throwing over half their ballast, when they were about one-third way across the Channel. When they got about half way across, they found themselves descending again, upon which, they threw over the balance of their sand; also some books they had with them. All this failed to overcome the gravitating power of the balloon. They next commenced throwing overboard their apparatus—cords—grapples, and bottles. An empty bottle seemed to emit smoke as it descended, and, when it struck the water, the shock of the concussion was sensibly felt by the aeronauts. Still, their machine continued to descend, when they next betook themselves to trowing off their clothing; but, having now nearly reached the French coast, the balloon began to ascend again, and rose to a considerable height, without compelling them to dispense with much of their apparel. They passed over the highlands between Cape Blanc and Calais, and landed near the edge of the forest of Guiennes, not far beyond Calais. The magistrates of the town treated the aerial travelers with the utmost kindness and hospitality. The King of France made M. Blanchard a present of 12,000 livres, as a token of appreciation of the aeronaut's perseverance and skill, in the newly-discovered art.

Several hundred ascensions had now already been made, and not a single fatal accident had yet taken place; but we are now compelled to record one which proved most disastrous to its projectors, and when we fairly estimate its design, it seems as though it could hardly have terminated otherwise. Pilatre de Rozier and M. Romain were anxious to return the compliment of M. Blanchard and Dr. Jeffries, by crossing over the Channel from France to England. For the purpose of avoiding the difficulty which attended Blanchard's balloon in keeping her up, they constructed a compound balloon. This was arranged by suspending a fire balloon underneath the hydrogen balloon. The fire balloon was intended to regulate the rising and falling of the whole machine. The hydrogen balloon was of a globular shape, forty feet in diameter; the other was about ten feet in diameter. After various delays, occasioned by adverse winds, he, in company with M. Romain, set out from Boulogne, on the 15th of June, 1785. Scarcely a quarter of an hour had elapsed, when, at the height of about 3,000 feet, the whole apparatus was discovered to be on fire. Its scattered fragments, with the unfortunate bodies of the the aeronauts, fell to the ground near the sea shore, about four miles from Boulogne. They were instantly killed by the tremendous crash, and their bodies were of course awfully mangled.

TESTU'S REMARKABLE VOYAGE.

"On the 18th of June, 1785, M. Testu ascended from Paris. His balloon was twenty-nine feet in diameter, constructed by himself, of glazed tiffeta, furnished with auxiliary wings, and filled, as had now become the fashion, with hydrogen gas. It had been much injured by wind and rain during the night before its ascension; but, having undergone a slight repair, it was finally launched, with its conductor, at four o'clock in the afternoon. The barometer then stood 29.68 inches, and the thermometer as high as eighty-four degrees, though the day was cloudy and threatened rain. The balloon had at first been filled only five-sixths; but it gradually swelled as it become drier and warmer, and acquired its utmost distension at the height of 2,800 feet. But to avoid the waste of gas or the rupture of the balloon, the navigator calculated to descend by the reaction of his wings. Though this force had little efficacy, yet at half-past five o'clock he softly alighted in a corn-field in the plain of Montmorency. Without leaving the car he began to collect a few stones for

ballast, when he was surrounded by the proprietor of the corn and a troop of peasants, who insisted on being indemnified for the damage occasioned by his idle and curious visitors. Anxious now to disengage himself, he persuaded them that, his wings being broken, he was wholly at their mercy. They seized the stay of the balloon, which floated at some height, and dragged their prisoner through the air in a sort of triumph towards the village. But M. Testu, finding that the loss of his wings, his cloak, and some other articles, had considerably lightened the machine, suddenly cut the cord, and took an abrupt leave of the clamorous and mortified peasants. He rose to the region of the clouds, where he observed small frozen particles floating in the atmosphere. He heard thunder rolling beneath his feet, and as the coolness of the evening advanced, the buoyant power of his vessel diminished, and at three quarters after six o'clock, he approached the ground with his car near the Abbey of Royaumont. There he threw out some ballast, and in the space of twelve minutes rose to a height of 2,400 feet, where the thermometer stood only at sixty-six degrees. He now heard the blast of a horn, and descried some huntsmen below in full chase. Curious to witness the sport, he pulled the valve and descended at eight o'clock, between Etouen and Varville, when, rejecting his oars, he set himself to gather some ballast. While he was thus occupied, the hunters galloped up to him. He then mounted a third time, and passed through a dense body of clouds, in which thunder followed lightning in quick succession.

> 'With fresh alacrity and force renewed,
> Springs upward, like a pyramid of fire,
> Into the wild expanse, and through the shock
> Of fighting elements, on all sides round
> Environed wins his way.'

"The thermometer fell to twenty-one, but afterwards regained its former point of sixty-six degrees, when the balloon had reached an altitude of 3,000 feet. In this region, the voyager sailed till half-past nine o'clock, at which time he observed from his 'watch-tower in the sky' the final setting of the sun. He was now quickly involved in darkness, and enveloped in the thickest mass of thunder clouds. The lightnings flashed on all sides, and the loud claps were incessant. The thermometer, seen by the help of a phosphoric light with which he had provided himself, stood at twenty-one degrees, and snow and sleet fell copiously around him. In this most tremendous situation, the intrepid adventurer remained the space of three hours, the time during which the storm lasted. The balloon was affected by a sort of undulating motion upwards and downwards, owing, he thought, to the electrical action of the clouds.* The lightning appeared excessively vivid; but the thunder was sharp and loud, preceded by a sort of crackling noise. A calm at last succeeding, he had the pleasure to see the stars, and embraced this opportunity to take some necessary refreshments. At half-past two o'clock the day broke in; but his ballast being nearly gone, he finally descended a quarter before four o'clock, near the village of Campremi, about sixty-three miles from Paris."

THE PARACHUTE.

As the chief danger in the early practice of balloon voyages consisted in accidental and rapid descents, the parachute was introduced to countervail this danger, and which would also enable the aerial voyager, in case of alarm, to desert his balloon in mid-air, and drop, without sustaining injury, to the ground. The meaning of the French word *parachute* is literally a guard against falling, *parapluie* (an umbrella) is a guard against rain, and *parasol*, a guard against the sun. The parachute resembles a large umbrella, and has been used from remote ages in the east by vaulters in jumping from great heights.

FRENCH AEROSTATIC INSTITUTE.

In the early part of the French revolutionary war, an aeronautic school was established at Mendon, near Paris, to instruct pupils in the art of *reconnoissance*. It was got up with the greatest secresy, so that the allied Powers should not avail themselves of its advantages until the projectors had used it first, effectually. We pass over the aerial voyages of Gay Lussac and Biot, after the capitulation of Cairo, when the French army had returned from the African deserts; of Mosment, Garnerin, and extract from the *Encyclopædia Britannica*, the following interesting calculations of the mathematical buoyancy and expansion of balloons.

The Buoyant Force of Balloons.—Since balloons in their shape generally approach to the spherical form, it will be more convenient to ground our calculations on that figure. A globe one foot in diameter of common air at the level of the sea, and of the mean density and temperature, is found to weigh about the twenty-fifth part of a pound avoirdupois. Consequently, if a perfect vacuum could be procured, a balloon of ten feet diameter must rise with a force of forty pounds; one of twenty feet diameter with that of 320 pounds; and a balloon of thirty feet diameter would mount in the atmosphere with the power of 1,080 pounds, thus augmenting always in the ratio of the cube of the diameter. But air expands by heat about the 450th part of its bulk for each degree on Fahrenheit's scale; supposing, therefore, that the air included within the balloon were heated fifty degrees, it would follow that one-ninth part of this fluid would be driven out of it by the warmth, and consequently, that the tendency of the balloon to rise upwards would be equal only to the ninth part of the entire power of ascension. Were it possible to maintain a heat of seventy-five degrees within the balloon, the buoyant force would yet not exceed the sixth part of the absolute ascensional power.

The dilatation which the presence of humidity communicates to air will, during fine weather in this climate, amount generally to one-eighteenth part, though it may sometimes reach to more than the double of this quantity. But in the tropical regions, such dilatation will commonly exceed the twentieth part of the volume of fluid. Hence moist air thrown into a bag, likewise wetted, and sufficiently large, would cause it to rise in the atmosphere. To succeed, however, in this way, the balloon constructed of coarse linen would require enormous dimensions, not less than three hundred feet in diameter.

But it is the union of heat and moisture that gives to air the greatest expansion. The white smoke with which the balloons are filled on the Montgolfiers' plan, was found by computation to be at least one-third specifically lighter than the external air. This purer sort of smoke is scarcely anything but air itself charged with vapor, being produced by the burning of chopped straw and vine twigs in a brasier, under the orifice of the ballon. It would have required no fewer than 150° of heat alone to cause the same extent of rarefaction.

We have, therefore, sufficient data for calculating the buoyant force of the common fire, or smoke balloons. This force being estimated about twelve and a half pounds avoirdupois, when the diameter of the balloon is ten feet, would amount to 1,562½ pounds, if the diameter were fifty feet, and to 12,500 pounds if it were 100 feet. The weight of the linen case may be reckoned at two-fifths of a pound for a sphere of one foot in diameter. Consequently, a balloon of ten feet diameter would, without its appendages, weigh forty pounds; one of fifty feet diameter, 1,000 pounds; and one of a hundred feet diameter, 4,000 pounds. Such a balloon of ten feet in diameter would need twenty-seven and a half pounds to make it rise; but one of fifty feet diameter would ascend with a force of 562½ pounds, and one of a hundred feet diameter would exert an ascending power of not less than 8,500 pounds. There is besides to be deducted the weight of the cordage, the car, the ballast, and the passengers. It would require, on these estimates, a diameter of thirty-three and a half feet, to procure merely an equilibrium between the weight of the canvas and the buoyant force of the rarified air.

The hydrogen gas obtained from the action of dilute sulphuric acid upon iron filings is only six times lighter than atmospheric air; but the gas evolved during the solution of zinc in that acid, is not less than twelve times lighter than common air. The ordinary way of examining the specific gravity of the different gases requires a very nice operation—weighing with the most exquisite balance; a serious difficulty, which long retarded our knowledge of their comparative densities. In one of the notes to his "Treatise on Heat," Professor Leslie has pointed out a very simple method, founded on the principles of pneumatics, for discovering the relative specific gravities of the aeriform fluids. This consists in observing the time that a given portion of the gas, under a determinate pressure, takes to escape through a very small aperture. The density of the gaseous fluid must be inversely as the square of the interval elasped. Thus, the hydrogen gas procured from zinc, but without any depuration, was found, under the pressure of the same column of water, to flow thrice as fast as atmospheric air. This experiment is very striking, and requires no more apparatus than a cylindrical jar, open below and surmounted by a cap terminating in a fine tubular orifice.

On a very moderate supposition, therefore, and after making every allowance for imperfect operation, we may consider the hydrogen gas which fills a balloon as six times lighter than an equal bulk of common air. Consequently, such a balloon must exert five-sixths of the whole buoyant force corresponding to its capacity, or will have a tendency to mount in the atmosphere, that is equal to the thirtieth part of a pound avoirdupois for a globe of one foot in diameter. A spherical balloon of fifteen feet diameter would hence have a buoyancy of 112½ pounds; one of thirty feet, 900 pounds; and one of sixty feet no less than 7,200 pounds. Here follows an estimate of the weight of the silk used in balloons, which of course is to be deducted from the above ascensional powers, but which is much lighter than the silk I would recommend for such purposes. It is, therefore, omitted, as the aeronaut can make that calculation best from the balloon actually in use.

But the calculations now given would in strictness require a small modification. The weight of the envelop and all appendages must evidently compress the included gas, and thereby render it in some degree denser. To compute this minute effect, we have only to consider that the pressure of a column of atmosphere, at the mean temperature, and near the level of the sea, is 1,632 pounds, on a circle of a foot diameter. Thus, in the balloon of sixty feet diameter, if we suppose the whole load to have been 6,000 pounds, the compression of the bag would only amount to five-thirds of a pound for each circle of a foot diameter in the horizontal section, or correspond to the 979th part of the entire pressure of the atmosphere. But the weight of the confined gas being 1,200 pounds, its buoyancy must have suffered a diminution of somewhat more than a pound, or one-eleventh from the incumberance opposed to it.

PENNINGTON'S FLYING MACHINE.

Various individuals have attempted to navigate the air with machines entirely independent of balloons, and although no marked success has attended their experiments, still they deserve, on account of their ingenuity, a passing notice.

The first of these was the flying machine of John H. Pennington, of Baltimore, Md., whose description of it was as follows:

"The principle is the lateral pressure of the atmosphere, acting upon the inclined plane, the propelling power and wheel. The machine or inclined plane will resemble in figure the transverse section of a spheroid, in either side of which are openings for the purpose of admitting a pair of beveled wheels, by which the machine is to be propelled; and centrally situated between these is a small engine, by which the wheels are to be put in motion, by a chain band connected with the engine. It is proposed to have the engine made of steel, so as to secure the greatest possible strength in the smallest possible compass—and to use spirits of turpentine or alcohol, which boil at about thirty-three and a half per cent. less heat than water; when 300 per cent. of strength may be obtained by using these materials, and the same proportionate weight of metal being dispensed with, which being calculated to work two and a half or three horse power—and to carry 450 lbs. exclusively of weight of engine, fuel, and dilating fluid, averaging 500 lbs. more. This would make a total of 950 lbs., which would require an extent in width of about 125 feet by 375. This, multiplied by itself, and one-third of the quotient deducted, would leave the number of square feet contained in the area of the disc of the inclined plane of the machine.

"The wheels, which are intended to propel the plane forward, are spiral or bevel-winged, situated in open-

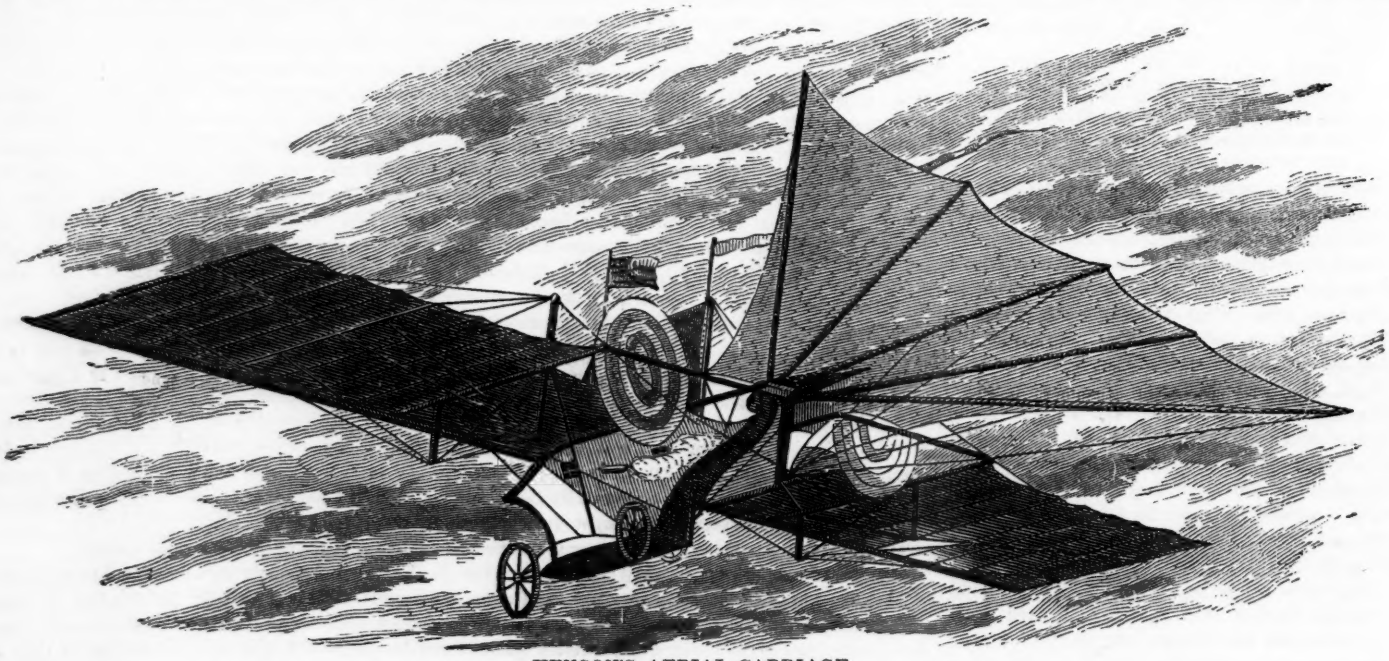
* It is caused by the uprising current of air which always prevails in thunder-storms. This would drive his balloon up to the top of the clouds, from whence it would fall into the vortex below again.

ings on either side of the plane, and formed on the common principle of the windmill wheel To the lower extremity of the plane is attached the steering power, capable of moving either vertically or horizontally. To calculate then the power of the machine, it must be considered in a state of equilibrium; that is, in the state where the power just balances it which is to overcome the resistance of the atmosphere. Having discovered what quantity of power will be requisite for this purpose, it will then be necessary to add so much more as to overcome the friction and weight of the machine itself, and to give the necessary velocity. The whole machine, then, in all its simplicity, resolves itself into the principle of the common boy's *kite*—the beveled-winged wheels, the momentum—and the engine, the power."

HENSON'S AERIAL CARRIAGE.

The next in order is Henson's aerial carriage, of which we prefix an engraving. *Newton's Journal of Arts and Sciences* says of it:

"The apparatus consists of a car, containing the goods, passengers, engine, fuel, &c.; to which a rectangular frame, made of wood or bamboo cane, and covered with canvass, or oiled silk, is attached. This frame extends on either side of the car, in a similar manner to the outstretched wings of a bird; but, with this difference, that the frame is immovable. Behind the wings are two vertical fan-wheels, furnished with



HENSON'S AERIAL CARRIAGE.

oblique vanes, which are intended to propel the apparatus through the air. These wheels receive motion through bands and pulleys, from a steam or other engine contained in the car. To an axis at the stern of the car, a triangular frame is attached, resembling the tail of a bird, which is also covered with canvas or oiled silk. This may be expanded or contracted at pleasure, and is moved up or down for the purpose of causing the machine to ascend or descend. Beneath the tail is a rudder for directing the course of the machine to the right or to the left; and, to facilitate the steering, a sail is stretched between two masts which rise from the car.

"The amount of canvas, or oiled silk, necessary for buoying up the machine, is stated to be equal to one square foot for each half pound weight, the whole apparatus weighing about 3,000 lbs., and the area of surface spread out to support it, 4,500 square feet in the two wings, and 1,505 in the tail, making altogether 6,000 square feet. The engine is proposed to be of from twenty-five to thirty horse power. It is stated, in the specification, that, on launching the machine into the air, an elevated situation must be selected, and the machine allowed to run some distance down an inclined plane, for which purpose vertical wheels are attached to the bottom of the car or boat. When the machine has thus acquired a momentum, the rotary fan-wheels are put in motion to raise it into the air and propel it; the rudder appended to the car is then used for regulating its course.

"In concluding our hasty remarks on this invention, we would remind our readers that many projects of a like character have been promulgated to the world by enthusiastic projectors, all of which have fallen to the ground (we use a figure of speech, for they have never risen), from the fact of having overlooked the laws of matter, and miscalculated the powers of mechanism, in imitating the functions of animal life.

"The engraving of this machine represents the aerial steamer flying. The bat-like wing, or sail, is the tail which turns on joints; answering the same purposes as the tail of a bird; and can be depressed, elevated, contracted or expanded, at the will of the commander. The car, containing the steam-engine, cargo, conductors, and passengers, in suitable compartments, is represented by windows, and three wheels upon which the carriage can run on land. Aerial goes foremost, and is a little raised: to the middle of the other is jointed the tail. The carriage is two hundred and fifty feet by thirty, and the tail is fifty feet long. The rainbow-like circular wheels are the propellers, answering to the wheels of a steamboat, and acting upon the air after the manner of a windmill. The car is seen at one side, owing to the difficulty of representing it in an engraving *underneath* the surface of the carriage, where it is located, between and below the propelling wheels."

This invention was introduced eight or nine years ago, and drew the attention and commendation of the scientific both of Europe and America. It certainly comes nearer to the construction and consequent physical action of the bird, than any that has ever preceded it. It, moreover, embraces all the most rational conceptions, and fine mechanical contrivances, without the inefficient incumbrances, of all other flying machines that have ever been brought before the public. We might go on and multiply the description of plans and models that have been suggested of late years; but as the ones we have here given seem to embrace every valuable discovered feature of mechanism, it seems useless to waste time in their further investigation. Even Messrs. Porter and Robjohn's California balloon, which they designed should be propelled by steam applied to the Archimedes screw-wheel, is but a repetition of the suggestions made years ago. The propulsion of the spheroidal balloon by steam or any other power, applied to the windmill-like paddle-wheel, was first shown by a working model, put in motion by a clock spring, by Charles Green, of England, one of the most experienced aeronauts in the world, before the Polytechnic School of London, ten or twelve years ago. By reference to the London papers of that period, a description will be found concerning it. Mr. Green has gone farther than this—he has given us a plan by which a balloon may be made to ascend and descend without expending ballast or gas, which is certainly more valuable in the art of aerial navigation than any improvements lately made. And even this idea ("kodging") is said to have been first suggested as available in balloon sailing by Baldwin, a writer on aeronautics.

GAS AGITATION IN ENGLAND.

MR. FLINTOFF IN SHEFFIELD.

On page 218, we published a report of a meeting held in Carnoustie, Scotland, at which Mr. Flintoff delivered one of his characteristic addresses, aimed at the existing gas company of that town. We now present a report of his lecture at a similar meeting held in Sheffield, England, in which his remarks were more abusive in their nature, than any we have before noticed. If impositions are practiced by the particular gas companies which seem to have excited the ire of Mr. Flintoff, why cannot these abuses be set forth in a proper manner, without resort to vituperation and such senseless diatribes as the gentleman so freely indulges in.

Yesterday evening, Mr. George Flintoff delivered, in the Mechanics' Hall, the first of a series of lectures on the gas question, his subject being "meter irregularities." A small charge was made for admission, and the attendance was meagre. Mr. Councillor E. Round presided, and in opening the proceedings said he wished it to be distinctly understood that he was wholly disinterested in the matter. His firm, who were tolerably large consumers, had always been on extremely agreeable terms with the gas company, and he should be sorry if anything occurred to interrupt those agreeable relations. He also deprecated the creating of any ill-feeling between the consumers and producers of gas. There could, however, be no harm in listening to what Mr. Flintoff had got to say.

Mr. Flintoff commenced his lecture by stating that, since 1851, 150 towns in Great Britain and Ireland had reduced the price of gas one-half. This result he attributed to the agitation originated by the humble instrumentality of the gas-fitters in Sheffield in 1851. It had been discovered that gas could be diluted like spirits, and that meters were used capable of registering 60 per cent. against the consumer. But the people required to be supplied both with the measure and quality for which they paid. Hence the passing of the recent acts, which was only the precrusor of something better. In 1851, the Sheffield Gas Company, with gas at 5s. per 1,000 feet, paid only £8 6s. 8d. per cent. on a capital of £139,600; but now, with gas at 3s. 9d. per 1,000 feet, they paid 10 per cent. on £302,000. This proved that by lowering the price and improving the quality of gas, instead of injuring the shareholders, it would so largely increase the consumption of gas as to improve the property of the company, and secure them against competition. Both makers and consumers would thus be benefited. Though, therefore, he had ostensibly come to Sheffield to fight the battle of gas-fitters, he had really come to fight the battle of the public. If the Gas Company were wise, they would

make the concessions; but if they were obstinate, the public would have to do what had been done in other towns—take the supply of gas and water into their own hands. Mr. Barlow, the meter inspector of the Corporation, had fought the battle of good gas like a man, doing twice as much as he was paid for. Because he was honest, the officials of the company would drive him out of the town. But tyranny, oppression, and an attempt to interfere with the rights of labor, had proved the destruction of other companies, and would lead to the same result in Sheffield, unless those having the control of the company changed the course they had been lately pursuing, in insulting a man who knew twenty times more about gas than the united talent of the company put together. (Cheers.) Turning to the mis-construction of meters, Mr. Flintoff took credit for bringing about a great reformation in the state of gas meters in Liverpool, in 1855, and predicted that although what he was now going to state here might not be at once understood, it would be the sowing of a seed which would bear fruit in the future. He roundly denounced the selfishness of gas directors in general, comparing them to the Cornish man, who said—

"Of all my mother's children, I love myself best;
So long as I'm provided for, Old Nick may take the rest."

They were a glorious trinity of pounds, shillings, and pence, and if they would not get the pounds and shillings, would clutch the poor man's pence by charging him an exorbitant price, and supplying him with false meters. The ordinary meter he described as a "conjuring box," a "thief," and a "false balance, which was an abomination." It was to gas companies what the pump was to London milkmen—the agency by which the amount of bills could be kept up whatever the price of gas, and by which the cost of all accidents and blunders on the part of the gas engineer could be charged upon the public, instead of being paid by the company. In explaining the operation of meters, he stated that unsuspecting consumers had, by choking their meters with water, made them register against themselves, and that by filling them with water above the proper water line, it was in the power of a gas company's officials to make them systematically register against consumers. This game has been played upon hundreds of thousands of consumers in the United Kingdom. Reverting to Mr. Barlow, the lecturer urged his hearers to stick by the inspector, adding that he (Mr. Flintoff) had made a solemn pledge to the fitters that he would agitate this matter in Sheffield until he had got all the meters put upon a satisfactory basis, and gas twenty per cent. cheaper. (Cheers.) He explained the construction of "honest meters," both wet and dry, showing how, by taking out the screws at the side, top, and bottom, after the visits of the meter taker, the consumers might themselves reduce the quantity of water to the proper quantity. He urged that the collecters ought to be sent round to the poor consumers for their gas rent weekly, instead of—as now—crawling along the streets once a quarter, thinking that they did a great deal for what they got; and that by bringing the opinion of the Council to bear upon the question, the consumers might get gas at 2s. 6d. or 3s. per 1,000 cubic feet, as at Sunderland, and the different classes of shareholders all get 10 per cent., instead of fighting, as the A, B, C, and D shareholders now were, like Kilkenny cats, for full dividends. The gas fitters' agitation of 1851 had saved the town £20,000 a year, and at the same time, by increasing the consumption of gas threefold and teaching the company their business, had made the property of the shareholders more valuable than ever. Mr. Flintoff indulged in strictures upon the lawyers engaged in fight between the last new and the old company. He went into figures to show that the raw material of gas only cost 3d. per 1,000 cubic feet; passed some severe strictures on the engineering of the Sheffield Company, and denounced shareholders who, while content with 4 per cent. from railways, would screw 10 per cent. from the poor sempstress and shopkeeper. Mr. Flintoff fiercely denounced the holders of the new shares of the Gas Company in reference to their demand for a reduction of the price of gas to 3s. 6d. per 1,000 feet; and affirmed that by purchasing the Gas Company at the market price, the Town Council might save £18,000 per annum. He ridiculed the monthly reports to the Town Council as to the illuminating power of gas, stating that there were not 20 men in the kingdom whose evidence on that point was worth having. After again extolling Mr. Barlow, he, in conclusion, complained that Mr. Unwin, the managing director of the company, had endeavored to injure him in distant towns. On the motion of Mr. Dixon, seconded by Mr. G. Cropper, the following resolution was unanimously passed: "That the thanks of this meeting be given to Mr. George Flintoff for his very able lecture on the gas question; and it regrets to find that the manager of the Sheffield United Gas-Light Company has endeavored to injure his professional reputation by the publication of statements calculated to lead the gas consumers of other towns to believe that his exertions on behalf of the inhabitants of Sheffield have been unproductive, when, in truth, the reductiou in the price of gas from 5s. to 3s. 9d. per 1,000 cubic feet has saved the inhabitants of Sheffield £12,000 a year." Thanks to the chairman concluded the proceedings.

Gas in Large Cities.—The New York *Tribune* of January 15th, publishes the following remarks on gas in large cities:

Perhaps the only matter of most general importance to the inhabitants of New York, aside from the ordinary necessaries of life, is gas. Perhaps there is nothing else which is the cause of so much grumbling, and perhaps nothing else in relation to which grumbling is calculated to do so little good. If a man is dissatisfied with his gas bill, even if he can demonstrate beyond the fraction of a doubt that he is the subject of a swindle, he has no redress. If he refuses to pay his bill, his gas is cut off, and his only remedy is to pay up. If a man removes from a house or warehouse, and omits to pay his last gas bill, the next tenant has to pay it before he can have the gas introduced, and he can't help himself.

A very large number of New York merchants who reside in Brooklyn have to pay $2 50 per 1,000 cubic feet of gas in their places of business, while they pay only $2 per 1,000 for gas in their houses. The difference in the price of gas between New York and Brooklyn is 50 cents. At one time the price of gas in this city was $3 50 per 1,000, but the then existing monopoly was brought into competition with a new enterprise; hence the reduction. But the consolidation of interests tends to keep the price of gas still at an exorbitant rate. The citizens of Brooklyn have broken up the monopoly which controlled them for a time, by patronizing a new and distinct enterprise, "The Citizens' Gas Company." By this means their gas is 50 per cent. cheaper than it was a few years ago.

In presence of the fact that in London gas is only charged $1 12 per 1,000, the people considering even that a very high figure, it is fair to presume that the New York monopoly is making a revenue altogether too princely. If the New York Gas Companies do not like the London rates, they ought at least to adopt the example of the Brooklyn Companies, and make the price uniform. Let it be $2 per 1,000 cubic feet.

There will always be grumblers, of course, but by adopting the course suggested, the companies would make a very happy and wonderful reduction, and probably insure themselves against legislative interference, which may otherwise be invoked against them.

In response to the views above set forth, the annexed letters appeared in the *Tribune* the following day:

HEAVY GAS BILLS.

To the Editor of The N. Y. Tribune:

Sir,—As a sufferer, and feeling thankful to you for yoor remarks on the subject of gas in large cities, I take the liberty of asking you to include in the purport of your censure, if so by the companies it may be taken, the Harlem Gas-Light Company, who have charged, and to whom I have paid, the enormous price of $3 per 1,000 feet, and the complaint as to such charge is universal among the residents of the upper districts, who of necessity must submit to the exaction.

New York, Jan. 15, 1862. A Tax-Payer.

GAS—LET THERE BE LIGHT.

To the Editor of The N. Y Tribune:

Sir,—I notice your article in to-day's issue in regard to Gas Light, and though I agree with you in the main, I differ from you in regard to the remedy. If the Citizens' Company of Brooklyn is such a relief, then all you New Yorkers have to do is to wait the action of the Metropolitan Gas-Light Company, who, I understand, have their capital paid up in full, and will be ready for operation in a few months. But I apprehend that, like the Brooklyn competition, it will, in reality, afford no relief to the consumer.

It is not generally known that gas can be made of petroleum (coal oil) and naphtha, and at an expense not exceeding one quarter of the price now paid for coal gas—the illuminating power being thirty per cent. greater. A new apparatus, just invented, will, as soon as the proper papers are filed, be shown to the public, by which every man can make his own gas on his own premises; and by attaching to the ordinary gas fixtures, the apparatus referred to, which will not take up much more room than an ordinary gas meter, gas can be made for 60 cents per 1,000 feet; and where a whole block join together and connect their pipes, and use only one apparatus, it will not cost over 50 cents per 1,000.

In England, coal and labor are much cheaper than here, and hence the difference in prices; but petroleum and naphtha are almost entirely the products of America, while the labor of making gas from them is merely nominal, not requiring more care than a common fire—in fact, not so much. I cannot explain further until after the caveat is filed, and then full specifications and drawings will be published. I can, however, say that an apparatus will not cost over $25 for an ordinary house, while for $150 the largest churches or theatres can be served.

Respectfully,

Brooklyn, Jan. 15, 1862. James T. Cummins.

The American Gas-Light Journal.—The wide circulation of this paper in Great Britain renders a notice of it in our columns almost superfluous. Devoted to the subjects of Light, Heat, Water Supply, and Sewerage, it has gathered around it some of the most popular writers on those topics, and presents bi-weekly a collection of original and translated articles that are copied extensively through the secular press, and stamp the Journal as one of the authorities of the present day.

Besides being the Official Gazette of the Gas and Water companies of the North and South American Continent, it has the advertising patronage of the Honorable the Light-House Board, and the National Aqueduct Department, of many of the American cities and States, together with a numerous list of houses engaged in the special and various branches of industry which it represents, and illustrations of all the new inventions of its kind.

The circulation of the American Gas-Light Journal in Europe is, we have reason to know, greater than that of, perhaps, all the European gas journals put together, while the area of its circulation includes nearly every country in the world—of course, in distant countries of foreign languages, it is confined to the gas and water-works only.

The American Gas-Light Journal is published at No. 39 Nassau street, New York city, at $3 (fifteen shillings sterling) per annum.—*London American.*

An Electric Gas-Engine.—Dr. Thomas Messom Meekins, LL.D., F. S. A., of London, barrister, at a recent meeting of the Royal Literary and Scientific Institution, Brighton, read a paper "On the Application of Electricity as a Locomotive and Projectile Force," in which he says,—"Gases generated under a high pressure will act fully as effectively as steam when admitted into the cylinder of a steam-engine. The tension may be raised to a point at which it would be perilous to work steam, owing to the facility with which the strength of the reservoir may be increased. Then no additional cost is incurred by working at the highest pressure; precisely the same electro-motive force is expended in effecting decomposition at all pressures. Thus the *strength of the reservoir* is the only practical limit to this enormous force, the real obstacle to its most economical application, an obstacle which, doubtless, will gradually yield to the ingenuity of engine manufacturers." He then enters minutely into the sources of the force and its amount, with that of the work which the gases can perform when employed in an electric gas-engine; and also proposes a new electric gas gun. In conclusion, he claims the idea or invention of both of these as entirely original. —*London Builder.*

Petroleum.—The operations in oil at this place are at the present time very extensive. Large quantities are going forward. In a single day (last Saturday) we were informed that twelve hundred barrels of oil were received at Union Station. The amount received there daily is very large. But we are told by shippers that more oil goes from this to other points, the Junction, Concord, &c., than to Union. That being the case, the probable number of barrels shipped daily is not far short of 2,500. The road between this and Union, as we passed over it on Saturday and Tuesday last, was so filled with oil teams as to render a passage along it very tedious, the road out of the beaten track being rough and rendering it difficult for teams to turn out to pass each other.—*Titusville (Pa.) Gazette, Jan. 9.*

THE AMERICAN GAS-LIGHT JOURNAL is published on the 1st and 15th of every month, and is the recognized official organ of

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Its purpose is to ascertain and make known all new discoveries in the science and economical application of LIGHT, and promote thereby the interests of companies and consumers; to encourage and aid the introduction of PURE WATER from Lakes and Rivers into Towns and Cities, and to improve the system of SEWERAGE, VENTILATION, HEATING, and DRAINAGE everywhere.

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THE
AMERICAN GAS-LIGHT JOURNAL,

PUBLISHED ON 1ST AND 15TH OF EVERY MONTH.

PROPRIETOR, JOHN B. MURRAY. } { EDITOR, C. ELTON BUCK.

SATURDAY, FEBRUARY 1, 1862.

The report of the New York Inspector of Gas-Meters for the year 1861, which we publish to-day, affords a striking evidence of the general correctness of the gas-meter, and is an effectual rebuke to the pedants of the FLINTOFF school, who, as we have before remarked, are unsparing in their denunciations of this instrument as commonly made. In a recent conversation with Mr. KITCHEN, who so acceptably fills the position of Meter Inspector, he added his evidence to the many sound arguments as to the general accuracy of this instrument by saying that the number of meters annually reported incorrect is so insignificant as to be hardly worth mentioning. Evidence of this kind, coming from an official whose position gives him an opportunity of impartially ascertaining the facts of the case, is worth far more than all the noisy declamations of those who would profit by creating distrust and doubts. It is an easy matter to start a controversy by making unfounded assertions. The trite old adage "give a dog a bad name" &c., is as true when applied to inanimate as well as animate things. This has been fully exemplified in the manner in which multitudes of gas consumers have taken the cue from leading agitators, and by having their fears worked upon by sophistical harangues, have sincerely believed gas companies to be unscrupulous corporations, dealing unfairly by their customers. Figures from official sources prove the falsity of such opinions, and as regards the meter in particular, the evidence of an officer like Mr. KITCHEN should go far to dispel such groundless ideas, and place the matter before the public in its true light.

The explosions of gas which have recently occurred in various localities, have drawn some attention to the subject, and have impressed upon the minds of consumers that care must be exercised, and certain precautions be adopted to guard against similar accidents. These casualties, which are increasing in frequency, are all attributable to carelessness, and from a neglect of that prudence which should be exerted by all sensible persons. In another column will be found an instructive article from the pen of Dr. CHARLES T. JACKSON, of Boston, Mass., which gas consumers would do well to ponder. By attending to the directions there laid down, no danger need be apprehended, and all such mishaps would be avoided. The suggestions in reference to the danger from the furnace fire in cellars of houses, in proximity to the gas-meter, and the remarks regarding the utility of always having a wrench hanging near at hand, are especially worthy of notice. The outlay caused by complying with these suggestions would be but trifling, while the sense of security which their adoption would cause, would amply repay their cost. It would be well for gas companies to issue circulars to their consumers, containing advice to be followed in any sudden emergency. We have recently referred to two gas explosions, in which much damage was done to property, both of which were clearly traceable to the real cause. If such directions as those given by Dr. JACKSON had been heeded, these accidents would have been avoided. It is well to give this subject its due share of attention, or other catastrophes are liable to occur, which may be prevented by a few words spoken in season.

We regale those of our readers who fancy sparkling effusions with another characteristic speech of Mr. FLINTOFF; this time addressed to the injured gas consumers of Sheffield, England. We have done this gentleman the favor of mentioning his name before. We print this phillipic as a specimen of the unprincipled manner in which such agitations are sustained, and to show that not only are false charges made, but false motives assumed in maintaining them. We hope the gas consumers of Great Britain are too wide awake to be imposed upon in this manner, but from the extent of the perigrinations of Mr. FLINTOFF, and the manner in which he perseveres in his undertaking, we are inclined to believe he must make some converts, and profit by it himself. It must be admitted that this view of the case is not very complimentary to the gas consumers of that country, but then human nature is weak, and artful designers are cunning, which facts may account for the partial success of Mr. FLINTOFF, and explain the reason of his progress.

A daily paper of this city, having during the past fortnight broached the subject of a reduction in the price of gas, finds willing responses from subscribers, who readily chime in with the hint thus expressed. In all the agitations of the cheap gas question in this country reference is made to the price paid for this commodity in London and other parts of England, and it is broadly inferred that a similar rate should rule in this city. In expressing such opinions, the relative cost of the production of gas in the two countries is entirely overlooked, and a conclusion is drawn which is manifestly incorrect. The price of labor and materials in England justifies the companies in putting their gas at a figure, which in this country would be totally inadequate to remunerate them. In addition to this the noted superiority of New York city gas, over London gas, renders it worth a much higher price. The gas made and sold by the Manhattan Gas-Light Company of this city, averages the year round, *sixteen* candles, while in London, the common gas rarely exceeds *twelve* candles, and often falls below that standard. In view of these facts, which are well understood by the engineering profession, it will be seen that the disparity in price is not so great as might be imagined, and if all the circumstances were known, the demands for further concessions would be unsupported by any logical arguments, however plausible they might at first seem.

REPORT OF THE LOUISVILLE, KY., GAS-LIGHT COMPANY.—This interesting paper arrived too late for our last issue, but will be none the less acceptable to our readers to-day. By Mr. COURTENAY'S letter it will be seen that he has adopted our suggestion of distributing his Report through the means of this JOURNAL, instead of in pamphlet form, as heretofore. Other companies will no doubt follow the example, as well from motives of economy as from other obvious considerations.

WM. D. PARRISH'S GAS-WORKS.—Attention is called to the advertisement of William D. Parrish, on another page. Mr. Parrish is the builder of several gas-works, among them those at New Castle, Pa., Smyrna, Del., and Warren, O., the last of which were lit up for the first time September 1, 1861.

REPORTS OF GAS-LIGHT COMPANIES.

LOUISVILLE, KY.

OFFICE LOUISVILLE GAS COMPANY,
Louisville, Ky., December 31st, 1861.

To the Stockholders of the Louisville Gas Co.:

Gentlemen,—We expected to have been allowed to present to you the decision of the Court of Appeals, respecting the extra dividend, involved in the suit of the City against the Gas Co., which was presented to the court one year ago for final action. The case has been postponed, and is now on the docket for February next.

This year we have purchased 107 dry meters for $994 32, and have charged to profit and loss $793 50 for 76 meters worn out and destroyed, while $758 43 has been charged to profit and loss for unpaid gas bills, ascertained to be worthless. The old boiler and engine house was too small for our present purposes, and the walls which supported the water-tank were cracked and unsafe. This building, together with the engine, boiler, and pump, we have removed; also, the two six-inch jet-washers and the two plunge-washers connected with retort house No. 1, are removed. The latter we have replaced by two 12-inch jet-washers in retort house No. 1, and two 36-inch cylindrical jet-washers, 12 feet high, in room adjoining, with new valves, pipes, &c., &c. The old engine building, with engine, boiler, and pump, and old washers, together with the new washers and apparatus to replace that removed, cost $2,571 74, which sum has been charged to profit and loss.

A brick building of a substantial character, covered with slate, has been erected, one wing of which encloses the two sets of condensers of purifying house No. 1. This portion of the building is 52½ feet long, 8 feet wide, and 22 feet 10 inches high, inside measure. A room 19 feet 9 inches by 13 feet 6 inches is attached for 36-inch washers. The boiler and engine room is 30 feet by 16 feet, 14 feet 8 inches high, in the clear, in which is placed a steam-engine with 8-inch cylinder, 19-inch stroke, with heater, pump, and governor complete, made by Ainslie & Cochran. The boiler is a single cylinder, without inside flues, 24 feet long, 40 inches diameter, set in masonry, with a flue underneath which divides at the end of the boiler, and returns on each side below the water-line to the front. At the back of the bridge wall of the furnace is placed an air-chamber in communication with the external air. The air is regulated by a register which allows it to pass through an iron plate the width of the furnace, perforated with 216 holes half an inch diameter. We find the arrangement economizes fuel; the refuse breeze mingled with a little coal-tar is the fuel used. We have introduced the city water to supply the boiler and the lavatory. In the same room is a pump to supply the works with well water. The room over the engine-room is of the same size, and 11 feet 5 inches high. This is fitted up as a lavatory for the hands. On the top of this room rests the tank for well water, which is made of ¼-inch iron, 18 feet 10 inches long, 17 feet 8½ inches wide, and 3 feet 6½ inches deep. The exhauster-room is 22 ft. by 17 ft. 8½ inches, 14 ft. 8 inches high, inside measure. In this room are placed two of McKensie's patent exhausters, made by Addison Smith, of New Haven, Conn., two compensators, self-acting and common valves, with gas-mains laid to retort-houses Nos. 1 and 2, and to the two purifying houses. In the same room is placed a drilling-machine, and in the second story (a room of the same size) a self-acting slide lathe, which swings 20 inches and turns 6 feet, both the latter machines made by J. O. Campbell & Co.; also a Wm. Selters & Co. patent bolt and screw machine. This building, together with the engine, boiler, and machines, tools, &c., &c., described, and shafting, pulleys, belting, and the mains connecting with other buildings, and pipes to convey the waste steam through the purifying house and exhauster room, plumbers' work, &c., cost $8,973 40, which sum is charged to gas-works. The quantity of gas made this year is 53,300,300 cubic feet. This is 4,259,400 cubic feet less than was made last year. The whole quantity of gas made in twenty-two years is 579,938,090 cubic feet. The greatest consumption of gas in one day this year was 252,900 cubic feet, on the 27th December. 1,292 applications for gas have been made this year.

1,348 meters have been placed; 1,454 meters have been displaced. There are now 106 consumers less than last year. The whole number of consumers is 3,433. 158 new services have been laid; 9 have been displaced. The whole number of services is 3,593. We have now 1,203 street lamps; 89 street lamps have been placed this year. We have this year laid 3,803 feet of two and four-inch street mains, making the whole extent of street mains 44 miles 2,714 feet.

Referring to the report of the cashier for details,

I remain, respectfully,

ROBT. G. COURTENAY, Pres't.

Product, Receipts, and Expenditures, in the manufacture of Gas, by the Louisville Gas Company, from the 31st December, 1860, to 31st December, 1861.

	Cubic Feet.	
Gas sold by meter	37,893,300	
Gas consumed in street lamps and loss by leakage, &c., &c	15,407,000	
Total product of gas	53,300,300	
RECEIPTS.		
Gas sold by meter and street lamps		119,035 72
Sales of coke		3,774 58
Sales of coal-tar		134 90
Meter rent		1,417 75
EXPENDITURES.		
Coal carbonized, used in office and shop and loss in weight 14,525,100 pounds	16,402 23	
Lime used in purification, 3,779 bushels	749 04	
Whiskey for wet meters, 5,000¼ galls	726 05	
Wages to workmen making and distributing gas	15,553 99	
Do. cleaning, lighting, and repairing street lamps	4,402 54	
Office expenses, stationery, &c., &c	5,635 57	
Repairs	6,625 55	
Taxes for 1861	1,510 21	
Balance, net product	72,757 77	
	$124,362 95	$124,362 95

STREET MAINS LAID TO 31ST DEC., 1861, 44 MILES 2,714 FEET.

2-inch.	3-inch.	4-inch.	6-inch.	10-inch.	12-inch.
63,816 ft.	35,525 ft.	120,686 ft.	2,950 ft.	8,521 ft.	3,536 ft.

DIVISION OF GAS WORKS.

Gas works proper	202,699 04
Street mains	181,894 37
Services	28,763 19
Meters	36,567 52
Street lamps	30,910 60
Real estate, for works, office, and shop	49,666 03
	$530,500 75

TOTAL COST OF WORKS.

The cost of the works, including real estate, was, on the 31st Dec., 1860	517,700 65

ADDITIONS IN 1861.

Gas works proper	8,442 20	
Street mains	1,789 68	
Services	722 62	
Street lamps	1,644 78	
Meters	200 82	
		12,800 10
Total		$530,500 75
The capital stock of the company is		481,400 00
The cost of the works exceeds the capital stock		$49,100 75

1861. PROFIT AND LOSS.

Jany. 1.	By balance from last year		32,674 43
July 1.	" Interest on city bonds, 6 months		2,310 00
"	" Gas bills		25 80
"	" Dividend on L. & F. Railroad stock		239 25
"	" Gas, six months		49,550 15
"	" Coke, "		1,777 72
"	" Tar, "		64 85
"	" Rent, "		149 40
"	" Rent of meters		340 25
"	" Gas fittings		466 79

1861. CONTRA.

July 1.	To counterfeit money	21 00	
"	" Disc't on uncurrent bank notes	12 50	
"	" Meters worn out	793 50	
"	" Repairs on gas works	3,729 54	
"	" Office expenses	3,934 22	
"	" Regular dividend 6 per ct. on $481,400	28,884 00	
"	" Balance to new account	51,223 88	
		$87,598 64	$87,598 64
	By balance		$51,223 88

1861. PROFIT AND LOSS.

July 1.	By balance from old acct		51,223 88
Dec. 31.	" Gas bills		10 26
"	" Rent		129 00
"	" Interest 6 months on City bonds		2,310 00
"	" Gas, six months		30,449 95
"	" Coke "		1,996 86
"	" Tar, "		70 05
"	" Rent of meters		1,077 50
"	" Gas fittings		441 72

1861. CONTRA.

Dec. 31.	To interest	160 89	
"	" Gas bills	1 76	
"	" Repairs on gas works	3,204 45	
"	" Office expenses	2,701 35	
"	" Old engine-house and machinery replaced	2,521 74	
"	" Gas bills deemed worthless	758 43	
1862.			
Jany. 6.	" Regular dividend 6 per ct. on on $481,400	28,884 00	
"	" Balance to new acct	49,476 60	
		$87,709 22	$87,709 22
1862.			
Jany. 6.	By balance from old acct		$49,476 60

Balance Sheet of the Louisville Gas Company, 1st Jan., 1862.

Capital stock, held by City of Louisville	200,000 00	
Do. held by the Gas Co. in trust for the city	5,250 00	
Do. held by individuals	276,150 00	
		481,400 00
Contingent fund to cover depreciation		70,000 00
Profit and loss, including dividend for January		78,360 60
Dividend No. 2 extra, in suit awaiting decision of the Court of Appeals		48,140 00
Louisville City, interest and dividend acct		28,198 40
Due lamplighters on acct		105 00
Dividends Nos. 41, 42, 43, and 44, unpaid		96 00
CONTRA.		
Louisville City bonds, held by Gas Co	77,000 00	
Stock in Louisville & Frankfort Railroad	3,765 00	
Do. in Louisville & Nashville Railroad	1,165 59	
Cash	25,861 75	
City warrants for city gas bills unpaid	21,686 51	
Louisville gas works, including real estate	530,500 75	
Gas fittings on hand	3,091 55	
Coal on hand	7,179 30	
Retorts now in store	774 46	
Cast iron lamps "	56 97	
Lime on hand	265 77	
Whiskey and alcohol	72 68	
Unpaid gas fitting bills	410 80	
Unpaid gas bills, due 1-4 Jan., City of Louisville	6,642 82	
Do. do. individuals	10,605 45	
	17,248 27	
Unpaid coke bills	278 80	
Gas bills	136 80	
City of Louisville Trust Fund	16,800 00	
	$706,295 00	$706,295 00

LOUISVILLE, Ky., Jan. 6th, 1862.

JOHN S. CAIN, Cashier.

Directors for 1862.

R. G. COURTENAY, President,
R. C. HEWITT,
T. T. SHREEVE,
JAS. W. HENNING,
GEO. W. MERIWETHER,
A. VATBLE.
} On the part of the stockholders.

E. BUSTARD,
L. L. SHREEVE,
PAUL DOMNELLI.
} On the part of the city of Louisville.

AURORA, IND., WATER-GAS CO.—By an advertisement on another page it will be seen that the water-gas works at Aurora, Ind., are offered for sale in consequence of urgent business calling the proprietor to a distant part of the country. A person with a moderate capital may find in this enterprise a favorable opportunity for investment.

WEST TROY, N. Y.—This gas company have declared and are paying a dividend of 4 per cent.

CITIZENS', BROOKLYN, N. Y.—This company are paying 3 per cent.

MANHATTAN, N. Y.—This company are paying 5 per ct.

NEW YORK, N. Y.—Ditto. Ditto.

WILLIAMSBURGH, N. Y.—Ditto. Ditto, and have increased their capital to $1,000,000. This company is not at all afraid of the Citizens', at Brooklyn, which threatens to extend its pipes to Williamsburgh.

REFLECTORS FOR GAS-LIGHTS.—A new reflector for gas-lights has been invented by Isaac P. Frink, of Newark, N. J. The reflector is intended particularly for goods in a store window, and the light illumines the space extending over the whole area of the surface occupied by the goods or other articles, while the eyes of the spectator are entirely shielded from light.

A VALUABLE PATENT.—The small, flat brass spring used on some kerosene oil lamps, to secure the chimney, is the invention of E. F. Jones, of Massachusetts. This patent has proved a very valuable one to its inventor, as from one burner factory in Connecticut alone, where 200 dozen burners per day are made, he is paid $300 per month.

ANSWERS TO CORRESPONDENTS.

C. C., of Pa.—*Chromium was discovered in 1797 by Vauquelin.*

G. J. McC., of Ohio.—*Phosgene gas is known in chemical nomenclature as chloroxicarbonic gas. Its formula is* CO Cl. *It is produced by the union of equal volumes of carbonic oxide and chlorine gases, which, under the influence of the solar rays, unite and form the new compound. This gas has a peculiar suffocating odor, which is readily recognizable.*

B. H. J., of N. Y.—*Your communication was duly received, and your requests will be attended to. We will hunt up the information you need, and will send you a copy of the document if one can be procured.*

J. M., Jr., of Vt.—*Although the fiscal year ends December 31st, the report is not yet ready for delivery. It is now in press, but will not be printed for a few weeks.*

W. J. B., of Ind.—*The city of Augusta, Ga., is lighted with gas distilled from pine wood; and the last reports we had from the company there, exhibited its affairs as being in a prosperous condition.*

B. & S., of Mich.—*We cannot respond favorably to your proposition. We have made it a rule never to commit the* JOURNAL *to the interests of any firm or business enterprise, and have always held aloof from similar proposals. There are many parties in this city who would be pleased to hear from you, and by casting your eye over our advertising columns you will find their address. This is all we can advise.*

J. S. F., of N. J.—*According to the researches of Graham, the liquid formed by the absorption of a gas in water, always occupies a greater volume than the water alone; its specific gravity is generally greater. In the case of ammonia and some other gases, the density is rather less than that of pure water. The greater the density of a gas, the greater also is that of its aqueous solution. In this combination the gas has lost its gaseous form and assumed that of a liquid; the combination may be regarded as that of a less volatile liquid with one possessing greater volatility.*

A. J., of Mass.—*Cold carbonic oxide gas, when burned, gives a blue flame, but when previously heated, it burns with a yellowish red flame.*

E. P. J., of N. H.—*The reports of this affair have been very much exaggerated, and do not deserve the publicity they have gained. We are inclined to believe your surmise incorrect, although we have no positive information to that effect.*

CORRESPONDENCE.

REPORTS OF GAS-LIGHT COMPANIES.

Office Louisville Gas Co., Jan. 6, 1862.

To the Editor of the AMERICAN GAS-LIGHT JOURNAL:

I enclose you our annual report for publication. You will send this Company *one hundred copies* of the JOURNAL containing this report, for distribution among our stockholders, with your bill for the same, and oblige ROBT. G. COURTENAY, Pt.

REPORT OF THE INSPECTOR OF GAS-METERS.

STATE OF NEW YORK.

Office of Inspector of Gas-Meters, 561 Broadway, New York, Jany. 18, 1862.

The number of gas-meters inspected at this office, for the year ending December 31, 1861, and sealed as correct	10,710
The number of proving apparatus inspected, for the use of gas companies	6
The total number of meters inspected, since May 1st, 1859	39,077
The whole number of proving apparatus, inspected since May, 1859	49

GEO. H. KITCHEN, Inspector.

REPORTS OF GAS INSPECTORS.

BALTIMORE, MD.

For the week ending January 9, 1862.

Illuminating power, in Candles.	Sulphur, grs. in 100 cubic feet.	Ammoniacal Gas.	Sulphuretted Hydrogen Gas.	Carbonic Acid Gas.	Pressure in Main, Maximum.	Pressure in Main, Minimum.	Burning pressure during trial of Gas.	Maximum Illuminating power.	Minimum Illuminating power.	Bromine condensation per cent.
14.8	less than 5 grains.	in great excess	none	none	3 3/8	1 7/8	3	17.9	12.9	4.35

WILLIAM E. A. AIKIN,
Inspector of Illuminating Gas.

REMARKS.

The mean pressure at night during the past week has been 3.4 inches, and during the day 2 inches; considerably more than of late.

For the week ending January 16, 1862.

Illuminating power, in Candles.	Sulphur, grs. in 100 cubic feet.	Ammoniacal Gas.	Sulphuretted Hydrogen Gas.	Carbonic Acid Gas.	Pressure in Main, *Maximum.*	Pressure in Main, *Minimum.*	Burning pressure during trial of Gas.	Maximum Illuminating power.	Minimum Illuminating power.	Bromine condensation per cent.
16.7	less than 5 grains.	in excess.	none	none	4 1/10	1 6/10	2/10	17.	16.5	5.25

WILLIAM E. A. AIKIN,
Inspector of Illuminating Gas.

REMARKS.

The average night pressure during the hours consumers are burning gas generally has been during last week 3.82 inches, the day pressure 1.9 inches—still higher than the previous week. But on the other hand, the illuminating power of the gas has gone up also.

For the week ending January 23, 1862.

Illuminating power, in Candles.	Sulphur, grs. in 100 cubic feet.	Ammoniacal Gas.	Sulphuretted Hydrogen Gas.	Carbonic Acid Gas.	Pressure in Main, *Maximum.*	Pressure in Main, *Minimum.*	Burning pressure during trial of Gas.	Maximum Illuminating Power.	Minimum Illuminating Power.	Bromine consd. on per cent.
15.58	less than 5 grains.	in excess.	none	none	3 8/10	2 0/10	2/10	16.5	14.	5.25

WILLIAM E. A. AIKIN,
Inspector of Illuminating Gas

REMARKS.

The average night pressure has been 3.78 inches, and the average day pressure 2.83 inches. The gas of very good quality.

TO GUARD AGAINST EXPLOSIONS OF GAS.

Dangerous explosions, arising from gas escaped from the pipes in houses and stores, have been rather numerous of late, especially in this city. These accidents have arisen, not so much from ignorance of the nature of the gas as from thoughtlessness on the part of the persons who have suffered from the explosions. The last accident which has occurred here was in the new house of Col. Lincoln, in Beacon street. He and his family had just removed into this house, and during the night the smell of escaped gas became manifest, and was traced to the basement room, where the meter was placed. Col. Lincoln, accompanied by his lady, incautiously entered this room with a lighted candle, when an immediate explosion took place. The force of the explosion was such as to throw out the front door-steps into the street some twenty feet, and to burst out the west side of the house—a thick brick wall—so that it will have to be removed, if, indeed, it will not be necessary to re-build the entire house. The heavy plate glass windows were blows into fragments, and Mrs. Lincoln was severely wounded in the face by them, while the Colonel was badly burned by the flame. It is supposed, in this case, that some pipe had been left open by the workmen who did the gas-fittings, but the facts are difficult to ascertain amid such ruins.

A few days afterwards, an explosion took place in the meter-room of our Post-office building, in State street, destroying the meter and the pipes connected with it, but inflicting no serious injury on the persons who had produced the explosion by lighting a match in order to discover the place of the leak.

Not long since, a severe explosion took place in the Tremont Temple building, owing to bringing a lighted lamp into a room in which there was escaped gas. Several persons present were badly burned, and considerable damage was done to the room by the explosion.

Previous to this, a severe explosion took place in the cellar of a store in Hanover street, owing to the search with a lamp for a gas leak, near the meter. The sidewalk was blown up, and considerable injury done to the lower part of the store, but no serious injury was done to the indiscreet person who carried the lighted lamp into the cellar, his hair having been singed and his face somewhat blistered by the inflamed gas.

These are a few of the accidents which have come under my personal observation. Many others have occurred, as may be seen on recurring to the files of our newspapers; and it is probable that as many such accidents have happened elsewhere in proportion to the population of the towns, as in this city.

What should a person do when he finds gas escaping in his house? First, *never go into the room where the gas is escaping with a lighted lamp or candle, nor with a lighted match.* If you cannot discover the leak in the dark, open all the windows and doors of the room, and let the gas escape into the open air, until you are sure, from the diminished smell of gas, that there is no longer any danger of an explosion.

The first thing to be done, of course, is to *shut off the gas* at the cock which connects the service pipe with the house pipes. This can be done in the dark, if your wrench is where it should be, hung up beside the cock. *See to it that this wrench is always kept in its proper place, so that you can find it in the dark.* I will venture to say that there are hundreds of instances in which this cannot be done, and that the wrench would be missing at the time when it is so much needed. After shutting off the supply cock, open the windows, as above directed.

If there is a leak, send for the gas-fitter at once, and have it mended. If it happens that your accidental leak takes place on Saturday night, as once occurred in my own house, you cannot get any mechanical aid until Monday, so resort to lamps and candles after you have shut off the gas and ventilated your house.

We have supposed that there was some leak in the pipes or from the meter in the above observations. If, however, the escape of gas is merely owing to a cock having been left open in one of the rooms, you are still to avoid entering the room with any flame. Find out in the dark, if you can, what cock is open, and shut it. If you cannot, then open the windows and doors, and thoroughly ventilate the room before you venture into it with a flame, and after the gas has been sufficiently removed, you can go into the room with a lamp and find the open cock and shut it.

A valuable article on gas explosions was published in this JOURNAL of the 16th December last, to which I would refer the reader for evidence as to the proportions of gas and air that form explosive mixtures, and it will be unnecessary for me to repeat the facts so well stated by Dugald Campbell, Esq., the chemical witness. I would merely add, that if a fire is burning in a room, or a lamp or other flame is there, the gas may be blown into the room until it mixes with the air in the minimum explosive proportions; then the explosion will take place. Therefore, if there is a burning furnace in the meter-room, and the gas escapes, it will explode, owing to the furnace fire.

C. T. JACKSON, M. D.,
State Assayer.

Boston, Jan. 13th, 1862.

SANITARY CONDITION OF NEW YORK CITY.

The report of Mr. Delavan, City Inspector, for last year, has been laid before the Common Council. This document, which is very wordy, and contains much irrelevant matter, is of unnecessarily large dimensions, and might have been cut down to less than half the size, thus economizing in expense and affording a lighter tax upon the patience of the reader. The following extracts from the report may interest some of our readers.

CAUSES OF DISEASE.

Among the causes which have induced the increased mortality of the present over that of former years, may be cited the density of our population, the crowded condition of our buildings, and the want of proper arrangements to secure ventilation. The numerous manufacturing establishments which not only surround the city, but which are found in its most compact quarters, with their crowds of workmen, not only add to the impurities of the atmosphere which creates disease, but these evils, perhaps to some extent inevitable, are aggravated by the condition of other circumstances injurious to health. I refer to the underground apartments, the hotbeds of febrile disease, where it exists in its normal condition, ready for all subjects that are placed within its reach. Nothing can be more idle than to expect that those who dwell in these vaults of sickness can remain in the enjoyment of health. The medical faculty with one accord join in this opinion, and the question is forced upon us whether it shall be permitted to landlords to let such tenements to lodgers.

In the upper part of the city, where the population is rapidly increasing, the fatal effects arising from the miasma of sunken and unfilled lots, from the pools of stagnant water with which many of them are filled, are to be seen in the records of our annual mortality. In these instances, it is not necessary to theorize upon the causes of disease. The facts present themselves in such precise array, that if a map were made, drawn solely from the bills of mortality in certain districts, it would be found to agree with the actual condition of the localities where disease exists in the most fatal form. Cause and effect are here presented so clearly that all further argument is at once set at rest.

TENEMENT HOUSES.

An estimate has been made which places us in possession of the information that the mortality of those occupying these abodes, including infants and children, is as one to twenty. There seems to be no doubt of the correctness of this estimate, or, if there be any error, it is that the proportion of deaths is larger than herein described.

The causes of this rate of mortality are at once presented on an examination of these buildings, which, at the outset, give the impression of the inadequacy of their accommodations for the purposes for which they are presumed to be constructed.

It is frequently the case that these buildings cover whole blocks, and such are the imperfections for the admission of light and ventilation, that in some places the sun is almost entirely excluded, and the air finds admission only from the doorway or the narrow passages leading to the rooms.

The exorbitant per centage which these places bring upon the investment of capital is so inviting to property owners that their increase ceases to be a matter of surprise.

If the continuation of these buildings as at present constructed and managed be an evil—as I conceive it to be—there is a way for its abatement. In Paris, buildings of this description are under the especial supervision of the authorities, and while the rights of the landlord are protected, equally are the comforts of the tenants attended to.

The passage of a law placing this kind of property under the surveillance of the authorities would, in my opinion, correct many of the evils and inconveniences connected with it.

As a preliminary measure of reform, no tenement of this description should be allowed to be occupied, unless by a special license from the city, granted only after a careful examination of the premises.

If found defective in any of the arrangements that concern the public health, the owner should be compelled to make the necessary alterations.

In case of non-compliance with orders to that effect, the house should be regarded in the same light as any other nursery of sickness, and be forthwith placed in quarantine, not to be opened to applicants unless with the especial permission of the authorities.

CONCERNING PHILADELPHIA.

It would seem idle to comment on the pretensions of the superior health made by some of our little rustic towns or cities, so-called, of a population less than the yearly number of emigrants that make this city their home.

These ambitious communities derive great consolation in displaying their records of deaths, as showing the superiority of health of vicinages not over half as large in population as some of our wards, compared with that of the largest immigrant receptacle in the civilized world; and from this comparison, with equal display of reason, they are induced to characterize our sanitary system as imperfect. Such comparisons may arouse the fears of the ignorant, but they are properly appreciated by the well-informed. If the subject were not too grave for ridicule, it would be quite as fair to institute comparisons between the health of these half-country towns and the sparsely settled rural districts, in which the superiority of the health of the latter might be easily proved, a fact which no one is disposed to dispute. But if the sanitary condition of a rural district is superior to that of a little town, it is surely no proof that the sanitary regulations of the latter are defective, any more than it is a proof that the health of a rural district is owing to the applications of the rules of sanitary science. Such comparisons are too absurd to be gravely urged.

The effect of our enormous immigration upon the sanitary condition of our city, in the problem which intelligent men are seeking to solve, and we cannot escape from the conclusion that no sanitary system can be framed calculated to improve the present condition of things, that does not provide for the destitute emigrant upon his arrival.

Is it not the dictate of prudence that some precautionary measure should be adopted in relation to the fifteen or twenty thousand yearly arriving at this port, and remaining in this city in a condition calculated to endanger the general health, mingling as they must with our population as they come from the ship reeking with the odors of the confined hold, their persons and clothes contaminated by its impure atmosphere?

SEWERAGE AND DRAINAGE.

In reference to the different condition of health in different localities, I would state that the proportion of deaths in the upper part of the city, east of Sixth avenue, has been greater, population considered, than in many other sections of the metropolis. The cause of this disproportionate fatality is directly traceable to the low and marshy grounds, and the want of an efficient system of sewerage and drainage to relieve the pools of their stagnant water. By proper attention to the matter, these districts, now the lurking places of disease, might be transformed into healthy localities.

Another cause of unhealthiness proceeds from the unceasing work of tearing up sewers recently constructed, for repairs or rebuilding. The exposure to heat and rains of the decomposed and poisonous matter thus drawn from its hidden receptacles and scattered in the streets, must of necessity prove deleterious to the health of the neighborhood. And in addition to this mismanagement of the sewers from the very start, the custom is practiced in too many instances of paving streets and avenues before they have been sewered.

London and Paris, from being the most unhealthy, have become the most healthy of the great cities of the world. Paris, at the beginning of the fourteenth century, lost by death one in every twenty of her population, while in 1860 the proportion stands as one to every thirty-five, and the present population of Paris is three hundred and fifty times greater than it was in the century referred to. The duration of life in Geneva, in 1833, was about forty years and five months, against twenty-one years and two months at the close of the sixteenth century. London, in the seventeenth century, was the most unhealthy of the capitals of Europe, and her progress in sanitary improvement has been so slow, that it is almost within a quarter of a century since she has proceeded with any acceleration at all adequate to keep pace with public necessities. Within that period, throughout England, thousands of acres of marshy and low grounds, hitherto worthless, and only known as hotbeds of fever and disease, have been reclaimed by a system of drainage, and similar progress and success has taken place in many of the Italian and German States.

It is a rule, without exception, that wherever we find sanitary improvements, we find that a system of sewerage and drainage has been the forerunner of that improvement, and this first step once taken, the most beneficial results have followed with a certainty that knows no failure.

The suggestions in reference to tenement houses and drainage are timely, and will, we hope, receive a due share of attention from the city authorities. The remarks on the comparative healthiness of "some of our little rustic towns or cities," which is aimed at Philadelphia, we regard as supremely silly, and entirely beneath the dignity which should characterize the official report of a functionary fulfilling the duties of Inspector. Such senseless perversions of facts may do well enough for squibs and playful rejoinders of the daily press; but in the case of an official report, the dignity of the office should be sustained, even if the ordinary personal deportment of the writer should not lead one to expect it. Philadelphia is known to be one of the healthiest cities in the world, and this satisfactory hygienic condition is due to the thorough manner in which the sanitary affairs of that city are administered. We hope that the future reports of the Inspector will contain no such asinine remarks as that referred to.

ON GAS ILLUMINATION.

The observation was made in the year 1664, by Dr. Clayton, that combustible illuminating gas was produced during the decomposition of coal by heat, and that this could be collected; one hundred years afterwards application was made of the fact. Lord Dundonald built some coke furnaces in 1786, and amused himself by collecting the evolved gases in tubes, and burning them, but without any definite object. Since the year 1792, another Englishman, of the name of Murdoch, to whom we are indebted for the invention of the useful application of gas, occupied himself incessantly with experiments up to the year 1796, which were crowned, in 1798, by the erection of the gas-work for illuminating the manufactory of Boulton & Watt. Independently, and about the same time, Le Bon, a Frenchman, succeeded in illuminating his house, which was warmed by the same means—thermo-lamp—by an apparatus in which he evolved bad gas from wood. Gas was employed by Winsor, for street illumination, in the year 1812, in London, and 1815 in Paris. Oil-gas was first prepared on a large scale by Taylor, in 1815.

Illuminating gas occurs in nature, and not very rarely; but is not of such good quality as that artificially produced. It has always been observed, where matter of organic origin, contained in rocks, is undergoing gradual decomposition. The celebrated holy fires at Baku, (Prov. Schirwan,) on the Caspian Sea, are due to the ignition of a gas which issues from the earth, and which Hesz has shown to be light carburetted hydrogen, with some naphtha vapor. It contained 77.5 carbon to 22.5 hydrogen. In New York they have gone still farther; the practical tact of the North Americans has already made use, for industrial purposes, of similar sources of gas, at Fredonia, on Lake Erie. The gas is there collected in gasometers, and used for illumination.* The burning fountain of Dauphiné is of like origin; but the soil of Italy, particularly in the neighborhood of the Appenines, is remarkably rich in such phenomena,—Pietra Mala, Barigazzo, Bologna, Parma, are the chief localities of this kind. Phenomena of a similar nature occur in the Cordilleras, in Hungary, Greece, England, and other countries.

NATURE OF ILLUMINATING GAS.

The general principles of illumination show that the lighting properties of a gas, or a mixture of gases, must depend upon the relation which the carbon in it bears to the hydrogen, and that it can only be burned to a useful purpose when there is more of the former of the two elements present than in fire-damp, and when the proportion of both approaches that of olefiant gas. Light carburetted hydrogen (CH_2) contains 75.4 carbon to 24.6 hydrogen; olefiant gas ($C_2 H_2$) 86 carbon to 12 hydrogen. The latter would have a decided preference above all, if it could be procured sufficiently cheap. This, however, is not the case; and we are obliged to be content, from motives of economy, with a mixture of gases, which is produced by the decomposition of certain substances of organic origin, and which contains so much olefiant gas that it far exceeds light carburetted hydrogen in illuminating power. When these organic substances are exposed to a certain temperature in closed vessels, the following process results. A coaly residue (coke) remains, and certain volatile products escape, which partly condense, on cooling into tar, and an aqueous fluid, whilst the rest is a mixture of gases, but contains also no inconsiderable portion of the volatile vapors of different compounds, which remain dissolved in the cooled gases, without being condensed to liquids. The researches of Sell, Blanchet, Runge, Kidd, and others, upon coal-tar, have led to the knowledge of a number of oily volatile products, of very different chemical character, and which are mostly carbo-hydrogens, with a very large proportion of carbon. To these belong kyanole, leucole, pyrrole, rosolic, and carbolic acids, and naphthaline—most of these contain 90 per cent. of carbon, naphthaline as much as 94 per cent., and in burning they deposit it in still greater quantity than olefiant gas. It is, therefore, easily conceived why the vapors of these substances remaining with the gas, so very much enhance its value. Such mixtures of gas and vapor are called illuminating gas, not as a definite compound, not as light carburetted hydrogen, or olefiant gas, but rather as a mechanical mixture of very various bodies, some of which are slightly or not luminous; whilst others are exceedingly luminous, as olefiant gas, and the carbo-hydrogens which possess similar properties, and to which the mixture is indebted for its illuminating power. It is a remarkable chemical peculiarity, that carbon and hydrogen are capable of uniting in the same proportions by weight to form a series of gases and liquids, which are only different on account of the different amount of contraction of volume which their elements undergo in the moment of combination, and this alone can explain the great multiplicity of solid, liquid, and gaseous hydro-carbons which are known to exist. It has already been stated, how differently certain substances, as wood, fat, and coal, are suited for the production of light gas. Coal, fats, or oils, resin and tar, asphaltum, soap-water, and the refuse of animal bodies, are all practically employed (some experimentally), according to the locality, in the production of gas. The different nature of these bodies requires that different modes of preparing the gas from them should be adopted; and these must be considered separately.

* It appears, from a paper of Mr. Richard Cowling Taylor, published in the *Philosophical Magazine*, for March, 1846, that the Chinese, although perhaps not gas manufacturers, have been, nevertheless, acquainted with the use of coal-gas, both for illuminating and heating purposes, long before the knowledge of its application was acquired by the Europeans. Beds of coal are frequently pierced in China by the borers for salt water, and the inflammable gas is conveyed in pipes to the salt-works, where it is used for boiling and evaporating the salt; other tubes convey the gas for lighting the streets, and the larger apartments and kitchens. When there is still more gas than is required, the excess is carried beyond the limits of the salt-works, and there forms separate chimneys or columns of flame.

COAL-GAS.

Experience has proved that cannel coal is far superior to all other kinds, both as regards the quantity and quality of the gas which it yields. Scotch Parrot coal is the next best kind. Even the Berlin gas-works use cannel coal from England. In countries where this is not to be met with, as in France, highly caking coal, of a similar character, is chosen for this purpose; and on the east coast of England, caking coal is generally employed for gas making.

The amount of gas obtained from a given quantity of coal depends very much upon the quality of the coal, and upon the manner in which the distillation is conducted; it is, therefore, very variable, as will be seen by the table below.

	Locality of the coal.	1 lb. hess gives C. F. hess.	Duration of the distillation hours.	Works at which the observations were made.
Observations upon a large scale, by Headley.	Deane coal, from Cumberland.....	8.66	6	Alliance Company in Dublin.
	Carlisle coal (Blenkinsopp).....	9.92	6	
	Equal parts cannel and Cardiff coal...	8.20	4	
Results obtained by the common process.	Lump coal, from West Bromwich..	5.7	....	Birmingham Company.
	Wigan, cannel, and Oldham, Watergate coal, mixed... ...	8.44	....	Manchester.
	Wigan coal, small..	7.3	....	Liverpool old Co..
	Wigan cannel coal..	8.4	....	" new "
	Derbyshire coal....	6.67	....	Leicester.
	Newcastle coal.....	7.56	....	London.

According to Accum, 100 cubic feet of coal give from 18,700 to 9,200 cubic feet of gas, according as the best kinds of Scotch or Lancashire coal are used, or the worst kinds of Staffordshire coal. At the hospital St. Louis, at Paris, the yearly average from as much coal was 12,300 cubic feet of gas; which is equivalent to 493 cubic feet of gas to the cwt. of coal; Prechtl estimates the produce at 700 cubic feet; so that the statements as regards the weight of the gas, vary from 12 to 17 per cent. The decomposition of the coal begins with the incipient red heat of the enclosing vessels, and lasts, when large quantities are employed, several hours, the quantity of gas gradually diminishing to the end. According to Peckston, in an eight hours' distillation, the relative quantities of gas given off are, in the first hour 20, in the second 15, in the third 14, in the fourth nearly 13, in the fifth 12, in the sixth 10, in the seventh 9, and in the eighth about 8 per cent. of the whole quantity, when the fire is uniform, and the vessels are constantly at a red heat. The cubic foot at the end, therefore, costs 2½ times as much as at the beginning. The quality of the gas, at the different periods of the distillation, however, must also be taken into consideration.

For this purpose it will be proper to cast a glance at the ingredients of the gaseous mixture in general: this consists, after the separation of the tar and the aqueous liquid, of: *olefiant gas, light carburetted hydrogen, carbonic oxide, hydrogen, vapors of the volatile oils of tar, sulphuret of carbon, ammonia, sulphuretted hydrogen, carbonic acid, cyanogen, sulpho-cyanogen, sulphurous acid, hydro-chloric acid, aqueous vapor, and nitrogen.* The carbonic oxide, and a part of the free hydrogen have, doubtless, the same origin, being formed from the moisture in the coal, or from the first portions of aqueous vapor that are generated, which, passing over the red-hot coke, are converted into those two gases. The nitrogen of the coal is obtained entirely as cyanogen and ammonia, partly in combination; and the latter is also found combined with sulpho-cyanogen, and the other acids forming volatile salts; the *free* nitrogen, on the contrary, is the residue of atmospheric air contained in the retort. Sulphuretted hydrogen and sulphurous acid are due to the sulphur (as iron pyrites) in the coal. The first four of the ingredients named, with the illuminating vapors of tar-oil, form the proper bulk of the gas; the others are small quantities of impurities which should have been separated with the tar. It has been found, by experience, that the relative proportions of these four ingredients vary with the duration of the distillation, and not in favor of the illuminating portion of the gas. When chlorine is added to light gas, it forms with the

olefiant gas and the vapors of tar-oil—with those constituents, therefore, upon which the illuminating power depends—a fluid compound, which separates, and the original volume is consequently diminished. The diminution which the volume of the gas suffers when mixed with chlorine is, therefore, in direct proportion to its illuminating power, and to the value of the gas—to the amount of olefiant gas (tar-oil vapors) which it contains. This explains the following statements, which contain the experiments of Henry, and are so far a correct representation of the process, and trustworthy, inasmuch as that observer followed analytically, step by step, the whole course of the evolution of gas. Henry found that, below a cherry-red heat, almost nothing hut hydrogen, atmospheric air, and some tar passed off, with hardly any illuminating gas; but that, at that temperature, illuminating gas alone appeared, and this was composed of a mixture of gases in the following relative proportions:

Time of collection.	Specific gravity	Absorbed by Chlorine.	Carburetted hydrogen.	Carbonic oxide.	Hydrogen.	Nitrogen.
		Out of 100 parts of gas from Wigan cannel coal.				
In the first hour,	0.650	18	82.5	3.2	0	1.3
	0.620	12	72	1.9	8.8	5.3
	0.630	12	58	12.3	16	1.7
5 hours after the commencement	0.500	7	59	11	21.3	4.7
10 hours after the commencement	0.345	0	20	10	60	10

As a general result, therefore, carburetted hydrogen is formed in decided excess, and the most luminous portion of this, which is condensible by chlorine, comprises only about 1-5th of the whole. These numbers also prove distinctly that, after the fifth hour, the quantity only increases, but the quality does not improve; indeed, this deteriorates so rapidly, that, at the expiration of ten hours, the gas which passes over is hardly luminous when ignited, but burns with a very faint blue flame.*

The immense increase of hydrogen which, at this last period, amounts to 60 per cent., is remarkable and very important to the manufacturer, an increase, which is no longer due to the decomposition of aqueous vapors, but to that of the carbo-hydrogens themselves. In accordance with an old observation, these are decomposed at a high-red heat, and deposit a portion of their carbon on the sides of the vessel. More recent experiments of Marchand show the progress of this decomposition very clearly. When olefiant gas was conducted through a red-hot tube, and the heat constantly augmented, the gas passing off, collected in successive portions, contained the following quantities of carbon to 100 of hydrogen:

Hydrogen : carbon.	Nature and temperature of the gas.	Hydrogen : carbon.	Nature and temperature of the gas.
100 : 614	Olefiant gas.	100 : 367	
100 : 580	Red heat,	100 : 325	Int'nse white heat.
100 : 538		100 : 307	Light carburetted hydrogen.
100 : 472		100 : 7	Cont'd white heat (nearly pure hydrogen.)

It is evident that this decarbonization is at last complete, and that it is very unfavorable to the illuminating power of the gas; it increases with the degree of heat, with the extension of the red-hot sides of the retort, and with the time that the gas is in contact with them. On a large scale, when the whole charge becomes at last converted into red-hot coke, this noxious influence can never be entirely avoided; but, with proper precautions, it can be kept within certain limits. Whatever precautions may be taken, the carbo-hydrogens must always pass over red-hot surfaces before they can reach the conducting tube, and hence, although only for a short time, they find the opportunity of depositing carbon, which is constantly produced in greater quantity than is desirable.

The practical man will find no further difficulty in adapting apparatus to suit the conditions prescribed. The best product will be obtained, when none but dry coal is used; and when this is directly brought into the retorts at a cherry-red heat, a uniform temperature being kept up throughout the process which should be immediately stopped, after the expiration of five or more hours, when the illuminating power of the gas begins to diminish. It must not be supposed, however, that the gas is directly produced from the coal, for the observations lead to the conclusion that tar is the first product, and that, by the further decomposition of it, the gas is generated. Hence, a certain temperature (below a red heat) gives rise to tar only.—*Knapp's Technology.*

* The specific gravity, as will be seen, keeps pace with the quality of the gas, and can thus far be taken as a test of its value. As pure olefiant gas has about the specific gravity of the air, (0.98,) the density of an illuminating gas must increase with the quantity of olefiant gas contained in it; yet an extraordinary amount of carbonic oxide (sp. gr. = 0.97), or of carbonic acid (sp. gr. = 1.52) may give rise to errors of some magnitude.

LAW REPORTS.

WETMORE *vs.* BROOKLYN, N. Y., GAS-LIGHT COMPANY.

A case of considerable importance to the commercial interests of Brooklyn is now before the Supreme Court in General Term. It is the suit of Wetmore *agst.* The Brooklyn Gas-Light Company for damages for refusing plaintiff permission to land goods at the wharf foot of Little street. The gas company built the dock, which extends a long way out in the river, and is adjoining their works, for their own convenience. Mr. Wetmore carries on an extensive storage business in premises adjoining. He wished to land merchandise at this dock, and the Gas Company refused this privilege. This suit is brought to test a question of law of great moment. The State, it is claimed, owns all beyond low water-mark in the East river, and may grant to riparian owners the right to fill in the ground and build docks, but the East river being a public highway those who build docks into the river hold the property subject to the rights of the public. They may charge wharfage, but cannot exclude those who may wish to land there, and thus create a permanent blockade of the river. This is the ground taken by the plaintiff, and which it is expected will be covered by the decision. As there are at present but few public docks in Brooklyn, the commercial interest is enlisted in favor of Mr. Wetmore's claim, on this ground if on no other.

EXPLOSION IN A KEROSENE OIL WORKS.—On the morning of January 15th, an explosion occurred in the kerosene oil works of Ingalls & Williams, at the foot of South Third street, Brooklyn, N. Y. Some time since the proprietors erected a new building at the end of the pier, in which all the machinery was placed. From some unknown cause, one of the worms connecting with a still in this building exploded, forcing the side out of the building and scattering the oil over the yard. The liquid ignited from the furnaces, and set fire to the woodwork about the premises. There was a large quantity of the oil in process of purification in other stills which also ignited, and the flames were extinguished with great difficulty. One of the workmen, named J. Parker, was injured while making his escape from the building. Most of the machinery was destroyed. The damage is estimated at $2,000, on which there is no insurance.

DANGER OF SOME WATERS FOR STEAM BOILERS.—A paper was lately read on this topic, by Prof. Bolley, before the London Chemical Society. He stated that waters containing the carbonates of lime and magnesia were considered better adapted for feeding steam boilers than those containing sulphate of lime. It had been laid down by several authorities that waters containing the carbonates were not so liable to form incrustations as those containing sulphates. This, Prof. Bolley had found, was a mistake. Water containing no sulphates whatever had, to his knowledge, formed an incrustation so thick on the inside of a boiler that the metal became red hot from the action of the fire. Upon examination, a small quantity of grease was found in the boiler, and this prevented the water from wetting the scale, hence the fire exerted its action on the metal and raised it to a dangerous red heat. It is, therefore, dangerous to permit grease to enter a boiler that is supplied with hard water. A little carbonate of soda added to the feed water of a boiler into which some grease may have found access, will help to render it soluble, and also soften the scale. Common clay added to the feed water of a boiler containing carbonate of lime, will tend to prevent the deposition of scale.—*Scientific Amer.*

PATENTS.

UNITED STATES.

3,025.—R. B. Pullan (assignor to J. D. Pullan), of Cincinnati, Ohio, for Improvement in Lamps:

I claim the making of the double concentric tube, a b, constituting the inner and outer walls of air passage, e, by striking it up from a single plate of sheet metal, in the manner described.

I also claim the combination of the bayonet catch, F, with the arm, f, of the traveling nub, d, both as a fastening for the wick tube and as a means of raising and lowering the wick, substantially as described.

3,026.—E. D. Rosecrans (assignor to himself, J. S. Hull and Nelson Gates), of Cincinnati, Ohio, for Improvement in Lamps:

I claim the employment of atmospheric pressure upon the surface of the fluid in the reservoir, x x, by means of the air-pump, w w', when used with the tubes. o o f f, and valve at d', in a lamp, substantially as described. I claim the air-pump, w w', when used in combination with the reservoir, x x, filling tube, p. and escape tube, r, in the manner and for the purposes substantially as set forth. I claim the employment of the burner and heater, when constructed with curved wings, b b, as described, when used with the tube, a, having an opening, a, in the manner substantially as set forth.

146.—I. P. Frink, of Newark, N. J., for an Improvement in Reflectors. Patented April 17, 1860:

I claim, first, The employment of an oblong pyramidal reflector lined with glass or other diaphanuous material, substantially as shown and described.

Second, The combination of the cover, B, with the pyramidal reflector, substantially as shown and described.

2,976.—W. A. Brown, of Philadelphia, Pa., for Improvement in Railroad Car Ventilators:

I claim a ventilator, consisting of the horizontal cylinder, B, with its conical frusta, b' b', the interior spiral passage formed by the partition d', in the rear end of cylinder. B, with the vertical cylinder, C, with its adjustable valve, F, the said parts being constructed and combined together with each other, substantially as described, and applied near each end of the roof, A, so as to operate in combination with the car in motion on a track, in the manner set forth and for the purposes specified.

34,045.—Charles Alexander, of Washington, D. C., for an Improvement in Camp Candlestick:

I claim the described combined cup and candlestick, as an article of manufacture, the same being constructed as and for the purpose set forth.

34,048.—S. G. Blackman, of Waterbury, Conn., for an Improvement in Lamps:

I claim, as an improved article of manufacture, a cone or deflector for lamp tops composed of metal and mica or other suitable transparent substance, substantially as described.

34,053.—D. A. Fiske, of Milwaukie, Wis., for an Improvement in Vapor Lamp:

I claim the arrangement of the removable cap, G, and the bundle of wires, H, filling the tube of said cap, in combination with the cup, R, also the manner of supporting the globe, M, by means of the stem. O, and the socket, L, in combination with the method of attaching and detaching the globe-supporter, W, by means of the screw, P. substantially in the manner and as and for the purposes described.

34,055.—J. E Gillespie, of Trenton, N. J., for an Improved Hydraulic Governor:

I claim the use of a rotary pump, F G H, in combination with a perforated cylinder, M N, and piston, P, for the purpose of regulating the speed of engines, substantially as above described and for the purpose set forth.

I also claim the use of the reciprocating zigzag bar, 2 3 4 5, in combination with the eccentric, X, and the piston, P, substantially as described and for the purposes set forth.

34,060.—Henry Isham, of New Britain, Conn., for an Improvement in Water Meters:

I claim the combination of the following elements, viz., first, the radial vanes on a vertical shaft; second, the surrounding case provided with a tangential induction pipe or passage, and with a central discharge at the bottom; and, third, the registering mechanism or the equivalent thereof, substantially as and for the purpose described.

And I also claim the flexible diaphragm and vibrating lever attached to it, in combination with the shaft of the rotating vanes and with the registering mechanism, substantially as and for the purpose specified.

34,065.—T. Mayhew, of Poughkeepsie, N. Y., for an Improvement in Lamps:

I claim elevating the chimney, F, perpendicular through the medium of the rods or guides, D D, substantially as and for the purpose set forth.

34,068.—J. A. Morrell, of St. Charles, Mo., for an Improvement in Pumps:

I claim the employment of one or more sliding cylinders having valves suitably arranged in them opening upward. in combination with a stationary main pipe, C, connecting rods, g g, and the eccentrics. G G, on the driving shaft, H, all arranged and operating substantially as and for the purposes described.

34,073.—G. B. Skinner, of Damascus, Pa., for Improved Water Wheel:

I claim uniting the outer cylinder, A, to the inner one, D, by a series of spiral buckets, B, that leave an open space, c, between themselves and the cylinder, D, substantially in the manner and for the purpose described.

34,080.—W. S. Thompson, of Rochester, N. Y., for Improvement in Lamps:

First, I claim the means, substantially as described, of preventing the escape of vapor from the wick through the opening left for the ratchet wheels, whereby all danger of explosion is obviated.

Second, In combination with the means recited in the first claim, I claim the arrangement described of the cap, C, burner, B, and ratchet wheel, d.

34,087.—M. R. Clapp (assignor to himself and Edward Mynderse), of Seneca Falls, N. Y., for Improvement in Steam Fire Engines:

I claim the combination and arrangement of two steam cylinders, the pistons of which move simultaneously in opposite directions, with the pump of a steam fire or other portable engine, substantially in the manner and for the purposes described.

35,001.—W. S. Bartle, of Newark, N. Y., for Improvement in Pumps:

I claim the combination of the hollow piston rod, B, capped or closed at the upper end of the valve, E, and head, with the cylinder in which they act, constructed and arranged substantially as described.

35,005.—George Collins and Enoch Piper, of Camden, Maine, for Improvement in Pumps:

We claim a pump, having a cylinder, A, constructed of glass, with its ends fitted in metallic heads, B C, as shown, in combination with the piston, E, of two metallic parts, i j, perforated as shown, and provided with the packing, F, and valve, m, and connected together by the screw and nuts, all arranged as set forth.

35,018.—P. W. Neefus, of New York City, for Improvement in Water Closets:

I claim, first, Working the valves, K and L and W, by the handle or rod, D, or its equivalent, as recited.

Second, Operating the lower valve independent of the upper with the same handle, as described.

Third, The combination of the valves, K and L, rod, D, raising water-valve box, E, and closet valve, A, as set forth.

BROWN'S SUSPENDED PURCHASE.—Our fellow-townsman, Wm. H. Brown, has sold the right to use his suspended purchase, on their own premises, to the Manhattan Gas Company, of New York city. Mr. Brown erected one of his purchases on their premises, and its capacity and ability has been fully tested, and receives the highest encomiums from scientific and practical men. The purchase erected is capable of conveying sixty tons of coal, one ton at a time, two hundred and three feet in an hour, piling it up forty feet high. By the former process, it cost this Company about forty cents per ton for the same work that the purchase accomplishes at a cost of three cents, making it a very great saving, as one hundred thousand tons of coal are used per year by them. The same gas-works are about erecting eleven more of Brown's Suspended Purchases on their premises, and when thoroughly at work, they cannot but prove to the world the usefulness and worth of this invention, it being applicable to many kinds of business in that city. We hope that Mr. Brown will soon reap a just reward for the years of toil and labor and expense which he has devoted to the perfection of his invention.—*Erie City Disp.*

COAL PRODUCT OF EASTERN PENNSYLVANIA.—The quantity of coal sent forward from the Southern and Northern Anthracite Fields, and from the Broad Top, Blossburg and Barclay Semi-Bituminous Fields, in the last three years was as follows:

	1861, tons.	1860, tons.	1859, tons
S. & N. Anthracite Fields.....	7,692,280	8,300,936	7,701,906
B. T., B. & B. Semi-Bit. Fields....	426,255	313.142	212,180
Total.....	8,118,535	8,614,078	7,914,086
	Dec. 495,543	In. 699,992	

There is coal forwarded from the bituminous districts on the waters of the West Branch of the Susquehanna, whence the Eagleton Coal Company ship an excellent article; but of the quantities of the shipments thence made, we are not informed. The coal mined on the West Branch is part of the product of Eastern Pennsylvania.

NEW USE FOR ANILINE.—Dr. Trumbull, of Liverpool, states that the sulphate of aniline is a new and powerful remedy for nervous diseases, such as St. Vitus's dance. He states that he has tried it in several cases of nervous twitching, and in one of paralysis, with complete success. It produces the remarkable effect of coloring the skin when taken internally, but this disappears in a few days after it has ceased to be used.

OFFICIAL.

OFFICE WILLIAMSBURGH GAS-LIGHT COMPANY.—Brooklyn, N. Y., Jan. 13, 1862 DIVIDEND.—The Board of Directors have this day declared a semi-annual dividend of FIVE (5) PER CENT., payable on and after Monday next, January 20.

The transfer books will remain closed until the 20th. C. F. BLODGET, Secretary.

OFFICE OF THE NEW YORK GAS-LIGHT COMPANY, 157 & 159 Hester, corner of Elizabeth street, New York, January 21, 1862.—At an election held on the 13th instant, the following-named gentlemen were chosen directors of this Company for the ensuing year:

Joseph Kernochan,	William A. Hadden,
Joseph Walker,	William C. Pickersgill,
Thomas W. Pearsall,	John H. Adam,
Guy Richards,	James R. Taylor,
Edward J. Woolsey,	Cornelius L. Everitt,
Joseph Sampson,	Henry R. Remsen, and
Henry Chauncey, Jr.	

At a subsequent meeting of the Board, John H. Adam was unanimously re-elected President; Cornelius L. Everitt, Vice-President; John Mowton, Manager, and Thomas K. Lees, Secretary.

CITIZENS' GAS-LIGHT CO.—At a meeting of the stockholders of the Citizens' Gas-Light Company, of Brooklyn, N. Y., held on Tuesday, 14th inst., the following directwere chosen:

William P. Libby,	Effingham H. Nichols,
William Spence,	James H. Stebbins,
Edward Anthony,	John Steward,
Samuel S. Powell.	

The Board elected the following officers: William P. Libby, President; James H. Stebbins, Treasurer; Hervey Warren, Secretary.

FOR SALE.

THE WATER-GAS WORKS AT AURORA, Ind., are offered for Sale, the owner being obliged to leave for California.

CAPACITY OF WORKS.

The Works have a capacity for making 24,000 feet of gas per day. About 12,000 feet of street pipe are laid, of 2, 3 and 4 inch diameter, with 1,600 feet yet to be laid.

CONSUMPTION.

The present consumption is 90,000 feet per month, which will be increased to 150,000 feet when the pipe is entirely laid.

RESULTS.

The results of a month's business, at 150,000 c. f. consumption, is as follows:

By sale of 150,000 c. f. gas, at $3 50		$525 00
To cost of 760 bush. coke, at 6 cts.	45 60	
" 1,064 galls. refuse coal oil, at 4c.....	42 56	
" 114 bush. charcoal, at 10c.	11 40	
Wages of 1 man, superintendent,	35 00	
" 1 boy, as help...	10 00	144 56
Nett profit on 150,000 c. f. gas.....		$380 44

The cost of making the gas given above—90 cents per 1,000 c. f.—is an outside price, and will be found to be nearer 75 cents in large quantities.

PRICE OF WORKS

The Works will be sold at the low price of $6,000, including the brick building, ground, meters, pipe, machinery, gas-fitting and blacksmiths' tools.

TERMS.

One-third of the purchase money—$2,000—cash; balance in 3, 6, 9 and 12 months, on interest secured on the property. For further information address H. M. A., Rooms of the AMERICAN GAS-LIGHT JOURNAL, No. 39 Nassau st., New York.

WATER-METERS.

H. R. WORTHINGTON'S PATENT Water-Meter.—This Meter combines accuracy, simplicity and remarkable durability, with such ease and certainty of motion, as to offer no appreciable obstructions to the flow of water in the pipes to which it is connected, as it runs and registers upon three inches head, or when delivering the smallest stream. These qualities, with its low cost, have caused its extensive adoption by corporations and individuals, in many of our largest cities.

HENRY R. WORTHINGTON,
61 Beekman street, N. Y.

CLAY RETORTS.

ADDISON POTTER,
WILLINGTON QUAY,
NEAR NEWCASTLE-UPON-TYNE, ENGLAND,
Manufacturer of CLAY RETORTS, FIRE BRICKS, and every description of FIRE CLAY GOODS.

ELLIMAN BROTHERS, 217 PEARL Street, New York, Commission Merchants, Importers of
BELGIAN FIRE-CLAY GAS RETORTS,
Dealers in Tiles, Arch-Bricks, Furnace-Doors, MOUTH-PIECES, COVERS,
And all other Fittings, of the most approved patterns, for setting Clay Retorts.
SABBATON'S PATENT FURNACE-DOORS, & FRAMES,
Floyd's Patent Malleable Iron Retort Covers,
MCKENZIE'S PATENT GAS EXHAUSTERS,
made by Addison Smith. Compensator-Valves, &c. Gas, Water, and Steam Tubes.

PHILADELPHIA FIRE-BRICK Works, corner of Vine and Twenty-third streets, Philadelphia.
JOHN NEWKUMET,
Manufacturer of all kinds of FIRE-BRICK, GAS-HOUSE TILES, to suit all the different plans in use. Clay Retorts and Dentists' Muffles. Orders filled at short notice

PATENT PYRO-CLAY GAS RETORTS. THOMAS HOADLEY, Patentee, wishes to call the attention of Gas-Engineers to these
RETORTS,
as a very superior article.
REFERENCES:—Gas-Light Works, Buffalo, N. Y.
" " Cleveland, O.
" " Chicago, Ill.
THOS. HOADLEY,
Corner of Main and Mulberry Sts., Cleveland, O.

NEW YORK FIRE-BRICK Manufactory. (Branch Works at Kreischerville, Staten Island.)
B. KREISCHER & CO., office 56 Goerck street, corner Delancy street, New York.
GAS-HOUSE TILES and FIRE-BRICK of all shapes and sizes. FIRE MORTAR, CLAY, and SAND articles of every description made to order at the shortest notice. B. KREISCHER. M. MAURER, A. WEBER.

CARBONIZED GAS.

IMPORTANT TO GAS CONSUMERS.

THE CARBONIZED GAS COMPANY, No. 476½ BROADWAY, New York, respectfully inform the public, that they are now prepared to supply GWYNNE'S PATENT CARBONIZER, and guarantee by its use to make a saving of 33 per cent. of their gas bills, and at the same time to produce a better light than the city gas. By this process, we warrant that there will be no collections of Carbon in the pipes, a chief difficulty with other machines of the kind.

Gas-Works and Water-Works.

D. PARRISH, JR., is prepared to furnish estimates for Gas or Water Works, and to erect them on the most improved principles. Office, 1416 Arch st., Philadelphia.
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AND GAS RETORT SETTER,
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DRIP POT FOR SUGAR MOULDS. Patent improved article by JARBOE & MACKEY, made of wrought iron, with malleable iron rim for tip to rest on; 100 per cent. better than any other pot, and costs less. One trial will satisfy refiners of their superiority. Nos. 401, 403, and 405 Cherry street, N. Y.

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STRATTON & BROTHER'S PATENT GAS-WORKS, for making Gas from ROSIN or COAL OILS. STRATTON'S Patent Double Retort, for Coal, Wood, or Rosin.

Our Patent Gas Works have been put up in some forty Country Residences, Factories, Churches, &c., in which an experience of *ten years* gives entire satisfaction.

Water Works also put up in country residences. All work warranted.

Reference—Prof. JAS. C. BOOTH, U.S. Mint, Phila.
CORNELIUS & BAKER, "
STRATTON & BROTHER,
719 Walnut street, Philadelphia.

BUTLER'S PATENT PORTABLE ROSIN GAS-WORKS,
FOR
Dwellings, Churches, Country Villages,
As well as for Consumers in Large Cities.
JOHN BUTLER,
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FOR LIGHTING RAILROAD CARS AND STEAMBOATS WITH GAS.
The whole process of Filling the Gas-Holders of a Railway Train, requires but Three Minutes.
Apply to the
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WORTHINGTON'S STEAM PUMPS, extensively used by Gas-Light Companies. For Sale at greatly Reduced Prices.

Also, a new and highly successful Pump, driven by water pressure, requiring no attention or repairs, and the most economical water motor yet constructed.

Patent GATES, for Water and Steam-stops.
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ANTI-FREEZING APPARATUS.

FREEZING OF GAS-PIPES.—Walton's Patent Anti-Freezing Apparatus illustrated by Engravings in the AMERICAN GAS-LIGHT JOURNAL, of Jan. 1, 1861, page 212, is the most simple, durable and efficient of any known process.

See also certificates from Cincinnati, O., and Louisville, Ky. Gas-Works in same number, page
Address, JOHN WALTON,
Sup't Gas-Works, Louisville, Ky

GAS-METER FLUID.

FLUID FOR GAS-METERS.—The undersigned is prepared to furnish the Glycerine Meter Fluid in quantities to suit purchasers. *It does not evaporate, can be made to stand any degree of cold liable to occur in this country or in Canada, and does not corrode the metals of the meter. It has been in use successfully for the last three years.*

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LIVERPOOL AND NEWCASTLE CANNEL & COAL,
FOR
Gas-Manufacturers and House Use.
The careful shipment of the best qualities, of Cannel and Coal, at the lowest rates current at the time of engagement guaranteed.
T. W. PARMELE, Agt.,
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"PEASLEY CROSS" SUPERIOR HOUSE CANNEL.—The undersigned is receiving regular supplies of the above well-known and choice Cannel, selected carefully, for sale, ex ship or from store, in lots to suit purchasers, on reasonable terms.

Dealers can be supplied by lighters, at their yards, from ships Vanguard and New World, now discharging, and from other vessels to arrive.
Apply to RICHARD THACKRAY,
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F. BUTTS & CO. (Successors to BUTTS & KENDALL),
DEALERS IN THE CELEBATED
Sterling Coal,
Pittsburgh and other Gas Coals,
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CLEVELAND, OHIO.

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DANIEL THOMPSON, Machinist and Manufacturer of Stop-Cocks, Fire-Plugs, &c., for Water-Works, Stop-Cocks, Valves, Drip Pumps, &c. for Gas-Works, No. 133 Elfreth Alley, Philadelphia.

GASOMETER RIVETS.

PHILLIPS & ALLEN, Pennsylvania Avenue, above 22d street, Philadelphia.—GASOMETER RIVETS of all kinds.

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JOSEPH NASON & CO., Constructors of Apparatus for Warming Public and Private Buildings by Steam and Hot Water.

Improved Fans for Ventilating Hospitals and other Public Buildings.
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NEWSPAPER WRAPPERS. Mara's Patent Self Sealing and Folding Water-lined Newspaper Wrappers, $1.50 per 1000. Sold by all Booksellers and News Agents throughout the United States and Canada.
L. P. MARA, STATIONER,
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GAS THERMOMETERS FOR ascertaining and regulating the temperature of the gas while passing through the purifiers into the station meters. For sale at the Rooms of the AMERICAN GAS-LIGHT JOURNAL.

HOT WATER GAS STOVES, Manufactured by HUNTER, KELLER & Co., 144 Centre street, New York.
See Engravings on page 163, Vol. II. of this JOURNAL.

GLENDON COAL-OIL COMPANY of Boston, Massachusetts, incorporated June 1, 1859.
E. F. JONES & CO., Agents,
8 Kilby st., cor. Central, Boston, Mass.

THE

STERLING GAS-REGULATOR,

Improves the Light and Saves a Large Per Centage of Gas.

MANUFACTURED BY THE

WHEELER & WILSON SEWING MACHINE COMPANY.

It is well known that Printers require the best and most brilliant light In proof of the superiority of these Machines over all others, the following New York establishments are using them, and testify to their excellence:—New York Times, New York Herald, New York World, New York Tribune, New York Sun, Journal of Commerce, Courier & Enquirer, Evening Post, The Zietung, Dispatch, Leader, Scientific American, Advertiser and Spectator, Independent, Daily News, Harper's Monthly and Weekly, Transcript, Mercury, Atlas, Life Illustrated, Albion, Spirit of the Times, AMERICAN GAS-LIGHT JOURNAL, Christian Enquirer, Churchman, Church Journal, Christian Advocate, Christian Ambassador, Christian Intelligencer, Observer, Sunday Times, Sunday Courier.

By order of the New York and Brooklyn Common Councils, these Regulators are now used in the City Halls, Police Stations, Markets, and other Public Buildings in both cities.

They are Warranted by the

WHEELER & WILSON SEWING-MACHINE CO.,

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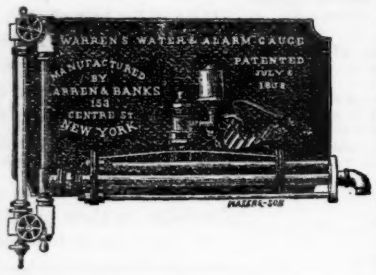
To keep in order, and always maintain the pressurs of the Gas at the lowest point for a brilliant light and economical combustion. They are so constructed that *under no circumstances can the Mercury get into the Meters, or in any way injure them.*

WARREN'S PATENT WATER & ALARM GAUGE

For Protecting the Flues and Preventing Steam-Boiler Explosions.



This is a reliable High and Low Water Detector, arranged so as to render it one of the best Water Gauges ever attached to a Steam-Boiler; always presenting before the Engineer at sight the exact height of the water, and if, by oversight or by sudden leakage, the water gets low in the boiler, it will cause an alarm before the water gets below the flues, thereby preventing an explosion. This Gauge can be made to alarm at any point desired as a High Water Detector, thereby preventing the water from getting to that height as to be forced into the cylinder of the engine, often causing serious accidents. Thus it is a High as well as a Low water Detector. For sale by

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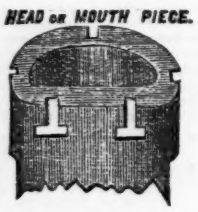

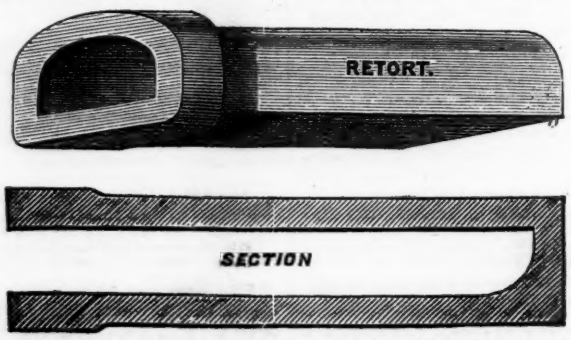

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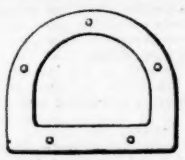

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Have always been, and are still, the most extensive manufacturers of FIRE-CLAY RETORTS in the United Kingdom, and were the only parties to whom a Prize Medal was awarded at the Great Exhibition, in London, 1851, for

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N. B.—J. C. & CO.'S RETORTS are well adapted for small Gas-Works, as they can be used without an Exhauster.

POTTS' REVOLVING SIGNAL LIGHTS,

PATENTED SEPTEMBER 8, 1857.

Mr. ALBERT POTTS, the well known Inventor of the LAMP-POST LETTER-BOXES, which have been adopted by the Post Office Department for the large cities of the United States—and also of the GAS METER BOX, to be set in the front walls of houses, thus doing away with visits from Gas Inspectors, or burglars in gas-clothing, has lately brought forward a third Invention, which in point of importance and world-wide usefulness, surpasses the others entirely.

These SIGNAL LIGHTS are intended for use on Vessels propelled by Steam, and those exclusively. They specially indicate the presence of a Steamer, and by their use, there will be less likelihood of mistakes, and consequent collision than at present. They are also intended for SIGNALLING AT NIGHT, and can be used for that purpose UNDER ANY CODE of SIGNALS NOW ARRANGED FOR FLAGS.

This Improvement in Lights for Steam Vessels, consists in having the Lanterns containing the colored lights, connected by means of a series of cogged gearing with some convenient part of the Engine or Machinery, so as to cause them to have a revolving motion around their axis. On side wheel steamers, the Lanterns should be placed directly over the wheel-houses, and the power, or motion to turn them, may then be very conveniently obtained from the paddle wheel shaft. On Propellers, the Lanterns should be placed on each side of the Pilot House, or hurricane deck, and the rotary motion derived from any convenient or suitable part of the Engine or Propeller Shaft. Each Lantern is supported on the end of movable cranes, so that their relative positions may be changed and properly adjusted to suit the view of observers on either side of the vessel at the time of signalling.

The Lanterns to be used in this improvement may be constructed for Burning Oils, Fluids, Gas, or any of the known modes of illumination, and should be furnished with one or more lenses and reflectors, so as to concentrate the rays of light, and project them over the horizon with the greatest intensity. The lenses for this purpose should be made with colored glass, viz., Red and Green, and the position of the respective Lanterns, according to the color of the lenses therein, must be placed on the sides of the vessel so as to answer to the requirements of Rules and Regulations made and published by the Supervising Inspectors of Steamboats, agreeably to the Act of Congress of the United States in such cases made and provided. That is to say—by said Regulation—the Lantern having the green lenses for producing the Green Colored Light, must be placed on the starboard side of the vessel, and the other Lantern producing the Red Light, to be placed on the port side thereof In pursuance, also, of the aforesaid Rules and Regulations, there is to be found in board and behind each Lantern, a screen to answer the purposes therein mentioned.

The cogged gearing, by which the Lanterns are connected with the Engine or paddle wheel shaft, and thereby caused to revolve when the Engine is in motion, is so arranged that the connection may be readily shipped or unshipped, and the lanterns made stationary or otherwise, at the pleasure of the Pilot, or those whose duty it may be to operate and attend to the same. The cranes on which the Lanterns are placed, are also rigged so as to be readily turned horizontally from one position to another, so as to present one or both lights to the view of observers when laying athwart ships at the time of signalling.

On the Use and Application of the Improvement for Night Signals.

When the vessel is under weigh, or going ahead in its course, the Lanterns are to be placed directly athwart ships, so that such colored light therein will then have the position and place prescribed by Rule Seventh of the aforesaid Supervising Inspectors of Steam Boats, and with the screens behind them, as above described, will then answer all the intents and purposes for which the colored lights are thus required to be used, as illustrated in the several diagrams published by said Inspectors for the working of a system of Colored Lights. The Lights in this case, according to the color seen by the observer, indicate the course or direction of the vessel whereon they are carried. When the Lanterns with the colored lights therein, are made to revolve around on their axis, as proposed in this improvement, in addition to the signal above, another, and as we believe, very important and useful signal is thus formed, indicating that the vessel, whereon it is carried is a Steamer. In dark foggy nights, it is found by experience, to be somewhat of a difficult task to distinguish sailing vessels from Steamers and Propellers, especially when the latter are rigged, and carry a press of sail. When Steamers meet "head and Head," it is the duty of each to pass to the right, or, on the larboard side of the other. Whereas, when a Steamer meets a sailing vessel, the former must give way and allow the latter to pursue its course. Hence, to carry out the regulations of the said Steamboat Inspectors, and prevent collisions, it is important to have some infallible sign, whereby the character of the vessel may be readily seen and determined. Several very fatal collisions have recently taken place through mistakes of this kind.

On Signals for Speed and Distance.

The gearing of the Lanterns with the paddle wheel or propeller shaft, may be so arranged as to be an index of their speed. A very good proportion, would probably be to make the Laterns turn about one third as fast as said shaft. Hence, when the speed of the vessel is previously known, when making a certain number of revolutions of the paddle or propeller, it becomes an easy task from observing the time with which the Lanterns thereon may be turning to approximate to the speed with which the said vessel is moving at the time of observation. Again, as the arcs described by the rays of light from each lantern, as they revolve around on their axis, is greater in proportion to the distance from said lantern, so will the time in which said rays move over any given space, be less in the same proportion. Hence, when the lights are very remote, or far off, from the observer, the duration of each column or cylinder, of rays from each lense, would pass the eye of the observer, in a short space of time, or with great velocity. Whereas, at a nearer point of observation, the time of its passage would be considerably lengthened, or the motion thereof apparently much slower. From these facts, we believe the improvement is susceptible of indicating, in an approximate manner, the speed and distance of vessels whereon the revolving lights may be used.

On the Application of the Improvement for Marine Telegraphic Purposes.

The Revolving Lights can be readily applied to the general purposes of Marine Signalling at night, as follows: In order to show this application, we have adopted the Numbers as given in Roger's Code of Marine Day Signals, believing that work to be somewhat of a standard in matters of this kind. Instead of the flags used in the above code, for day signals, to indicate the combinations of two or more letters of the Alphabet, which combination is referable to certain numbers indicative of the words or sentences telegraphed, we propose to perform the same operation, at night, by means of the two revolving colored lights, so as to indicate the numbers directly to which the intended words or sentences to be telegraphed are referable. Thus, whether the vessel to be signalled is ahead, astern, or abaft the beam, the position of the two colored lights must be so adjusted, by means of the moveable cranes, whereon said lanterns or lights are fixed, that the two lights may be fully made visible to the observer. When both lights are thrown into this position, stopping the motion of the lanterns may be the signal for calling attention, or a rocket fired off, or the steam whistle blown, would answer the same purpose. Now, in order to represent the ten numerals, we propose to indicate them by the respective motions of the two colored lights, as follows:

RED LIGHT.	GREEN LIGHT.
One Red, Represents Number 1.	Two Green, Represents Number 2.
Three do. do. do. 3.	Four do. do. do. 4.
Five do. do. do. 5.	Six do. do do. 6.
Seven do. do. do. 7.	Eight do. do. do. 8.
Nine do. do. do. 9.	One do. do. do. 0.

In the above arrangement, it will be seen that all the odd numbers are made by the Red Light, and the even numbers by the Green Light. In order to indicate the repeat of the last number, once or more times, or for other special purposes, which may hereafter be found useful and necessary, an even number of lights may be shown by the Red, and an odd number by the Green. It will be understood that when the Lanterns are made with three lenses in them, the numerals as above arranged are formed by the number of times a new light or lense is presented to the observer. Thus to indicate the number 3, the Red Light or Lantern would make one entire revolution; and to make the number 6, the Lantern carrying the Green Light would make two revolutions, and so on with the other numbers. When a symbol is made, the motion of the Lantern is to be suspended for a short time, and when a number expressing a sentence is formed, the lantern may be stopped for a longer period, or some one of the special signals above referred to, may be used for this purpose.

To show the application of this improvement as above mentioned, whereby these Lights can be used as readily for Night Signals, as Flags are used for Day Signals by the author of Roger's Code, we shall use the sign O colored red or green, according to the light used, to show the number of movements performed by the respective lights in order to represent any desired number of said code, suitable for the required purpose.

RED LIGHT.	GREEN LIGHT.
O, O, O, O, O,	
O, O, O, O, O, O, O.	
	O, O.
	O, O.

The above would represent the number 5722, and by reference to said Roger's Code, would be found to stand before the sentence:
"WILL YOU SHOW THE NUMBER THAT REPRESENTS YOUR NAME?"

RED LIGHT.	GREEN LIGHT.
O.	
O, O, O, O, O.	
O, O, O, O, O, O, O.	
	O, O.

Here the number expressed is 1572, and per the same Code, stands for
"WHERE ARE YOU BOUND?"

RED LIGHT.	GREEN LIGHT.
O.	
O, O, O, O, O, O, O, O, O.	
	O, O.
	O, O, O, O, O, O, O, O.

The number thus expressed is 1928, and per said Code is
"WHAT IS YOUR CARGO?"

RED LIGHT.	GREEN LIGHT.
O, O, O, O, O.	
	O, O, O, O, O, O.
	O.
O, O, O.	

Here the number expressed is 5603, and stands for
"HAVE YOU ANY NEWS?"

(RED LIGHT.)

Fig. 2

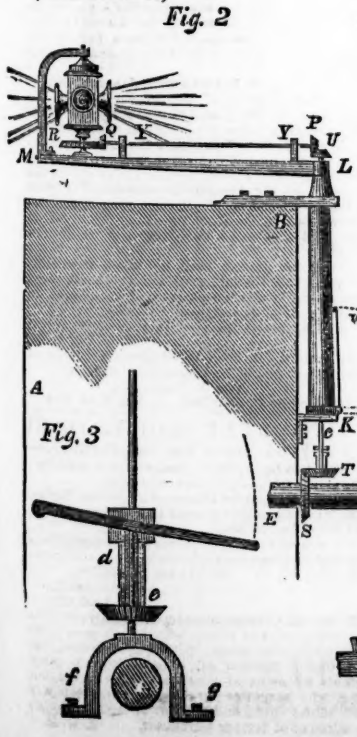

Fig. 3

(GREEN LIGHT)

Fig. 1

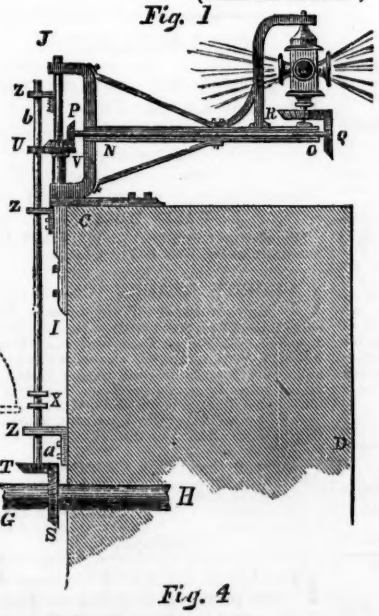

Fig. 4

MECHANICAL CONSTRUCTION.

In our engravings, Figs. 1 and 2, represent Vertical Sections through the wheel-house. In them E F and G H represent portions of the main Shaft. In Fig. 1, I J is a stout Iron or Wooden post, fastened against the side of the wheel-house, directly over the main shaft On the upper part of this post, is fitted the moveable arm or crane N O, to the main shaft is fitted the bevel wheel S, and to the lower end of the rod a b, is fitted a corresponding wheel T. U is a small pinion on a b, which gears with the spur wheel, V, which in turns gives motion to the wheels, P and Q, and so revolves the lamp R. It will be seen that a Rotary motion is given to the lamp, when the main shaft is in motion and a b connected.

It can be disconnected by a lever, acting between the bosses X, which will elevate the rod in the guides Z Z Z.

Fig. 2 is another arrangement, for the same purpose. In this, K L, represent a hollow Shaft, on which is firmly fastened, the arm L M, on which is the lantern. The hollow post is secured to the wheel-house by the straps K and B, and it can turn freely in them, the other part being the same in them as in fig. 1

The lever K W, when drawn down, will turn the frame in any required position around the Shaft c U. In fig. 1, the arm or crane N O, may be operated by cords from the wheel-house, but in this device, the rod c U, does not lift up as in fig. 1, but in its place, the lower end is made square, and on it slides the short tube, d E, shown in fig. 3. The lower end of the rod turns on a bridge, f g, spanning the main shaft. On the upper end of the tube, d e, a lever is attached by means of boxes and collars as shown in fig. 4. This lever when raised carries with it the beveled wheel T, thus disconnecting the gearing apparatus.

ALBERT POTTS, Patentee,
PHILADELPHIA, Pa.

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PROPOSALS.

Proposals for Stamped Envelopes.

POST-OFFICE DEPARTMENT, January 18, 1862.

SEALED PROPOSALS WILL BE received until 3 P. M., on the 13th day of February, 1862, for furnishing all the "Stamped Envelopes," "Letter Sheets and Envelopes combined," and "Newspaper Wrappers" which this Department may require, during a period of four years, commencing 1st April, 1862, viz.:

STAMPED ENVELOPES.

No. 1, or note size, 2⅝ by 4¼ inches, of white paper.

No. 2, or letter size, 3¼ by 5⅛ inches, and extra letter size, 3¼ by 6¼ inches, of white, buff, or cream-colored paper. or in such proportions of either as may be required.

No. 3, or official size, 3⅞ by 8¼ inches, of the same colors as No. 2, and under a like condition as to the proportion of each.

No. 4, or extra official size, 5 1-10 by 9 4-5 inches, of the same color as No. 2, and under a like condition as to the proportion of each.

Nos. 1 and 2 to be embossed with the three or six cent postage stamp, No. 3 with six cent, and No. 4 with twelve, twenty, twenty-four and forty cent stamps, all of style and color similar to those now in use.

Letter sheets and stamped envelopes combined, of white or blue paper. Note sheets and stamped envelopes combined, of white or blue paper, both sides embossed with the three cent. stamps.

Stamped newspaper wrappers, not less than 6 by 10 2-5 inches, and of buff paper, embossed with the one cent postage stamp, or any other denomination that may be required.

Proposals are also invited for furnishing straw or Manilla board boxes, or others of equal or superior strength, for packing parcels of envelopes, of letter sheets and envelopes combined, and of newspaper wrappers, containing from one hundred to five hundred each, and for waterproof wooden cases for packing parcels of four to twenty-five thousand.

The envelopes and wrappers are to be made in the best manner, of paper of approved quality, manufactured specially for the purpose, and with such water-marks as the Postmaster-General may direct. They must be gummed for sealing, the former at least 4⅛ inches on the point and one end of the latter; they must be banded in parcels of twenty-five, packed without charge for packing, and furnished complete in all respects, ready for use with all reasonable dispatch, and in such quantities as may be required to fill the orders of Postmasters, and must be delivered daily either at the place of manufacture or at the Postoffice Department, at the option of the Postmaster General, to an agent duly authorized by the latter to inspect and receive them.

An agent of the Department will furnish the address for each parcel, which is to be pasted on the box by the manufacturer without charge.

The dies for embossing the postage stamps on the envelopes and wrappers are to be executed in the best style, and they are to be provided, renewed and kept in order at the expense of the contractor. The Department also reserves the right of requiring new denominations of stamps and any changes of the dies or colors without additional charge.

Bidders are expected to furnish samples of paper with their bids of the quality they intend to use in the manufacture of the envelopes which they propose to supply, and also specimens of the envelopes unstamped, and of boxes.

In addition to bids for furnishing plain envelopes of the sizes and colors above described, separate proposals are invited to furnish envelopes provided with patent dissolving lines, (indicating the proper position for the superscription,) to substitute the plain or unruled envelopes, in whole or in part, as the Department may elect.

Proposals are also invited for devices other than water-marks, (or additional to such marks,) to afford protection against counterfeiting—specimens to be submitted.

The contract will be awarded to the bidder whose proposal, although it be not the lowest, is considered most advantageous to the Department, taking into account the price, the quality of the samples, and his sufficiency and ability to manufacture and deliver envelopes in accordance with the terms of this advertisement; and no proposals will be considered unless accompanied by guarantees.

Before closing a contract the successful bidder may be required to prepare new dies and submit specimen impressions thereof. The use of the present dies may or may not be continued, but no radical change in the device of the stamps will be adopted.

Bonds and security will be required for the faithful performance of the contract, and payments under it will be made quarterly. The Postmaster-General reserves to himself the right to annul it whenever he shall discover that the same or any part thereof is offered for sale in the market for the purpose of speculation, and he will not, in any case, sanction a transfer of the contract to any party who shall be, in his opinion, less able or less qualified than the original bidder or contractor. The right is also reserved to annul the contract for a failure to perform faithfully any of its stipulations.

The number of envelopes of different sizes and of wrappers issued to postmasters during the fiscal year ending June 30, 1861, is fully set forth in the last report of the Postmaster-General.

The bids should be marked "*Proposals for Stamped Envelopes and Wrappers*," and should be addressed to the "Third Assistant Postmaster-General, Post-office Department."

M. BLAIR, Postmaster-General.

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PATENT PREPARED WOOD-PIPE for Gas Mains.—Wm. Stephenson would call the attention of Gas Companies and Engineers to his Patent Prepared Wood Gas-Pipe. This Pipe is prepared in a way so as to effectually prevent its decay, and has been proven to be superior to Iron pipe in three towns where he has erected Gas-Works.

The cost of the Pipe, and the facility with which it can be laid, and *also its not being subject to expansion* and contraction by change of temperature, render it *entirely free from leakage;* there is also less condensation than in Iron pipe. These are among the advantages gained by the use of this Pipe, and are sufficient to recommend it to the favorable consideration of Gas Companies and Engineers; and it is considered, by those who have examined it, as a most valuable improvement.

A sample of this pipe may be seen at the rooms of the AMERICAN GAS-LIGHT JOURNAL, No. 39 Nassau street, New York; and further information, with reference to this Pipe, may be obtained by application to the Patentee,
WM. STEPHENSON, Gas Engineer,
Fremont, Ohio.

PATENT BITUMENIZED PIPES for Water, Gas, and Drainage.—Reduction in price on account of the exemption from duty on paper. These pipes possess all the properties necessary for the conveyance of Gas, Water, and also for Drainage purposes, viz., great strength, great durability, and perfect inoxidability; and being non-conductors are not affected by frost, like metal pipes; they are proved to resist a pressure of 220 lbs. on the square inch (equal to 500-ft. head of water), and can be made up to any greater strength if required. They are only one-fourth the weight, and when laid down are fifty per cent. cheaper than iron pipes; they are made in 7 ft. lengths, and the joinings are simple and inexpensive.

These Pipes have been in use nearly three years, and have given the most perfect satisfaction.

Further particulars as to joining, &c., and specimen pipes, may be obtained at the office of the Company, on application to
Mr. ALEXANDER YOUNG,
14 Cannon street, E. C.,
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GASOMETERS, RETORT-HOUSE ROOFS, WATER-TANKS,
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OFFICE FOR THE PROCURATION of Letters Patent and the Registration of Designs. JOSEPH WILLCOCK & CO., Patent Agents and Engineers, successors to Messrs. BARLOW & Co., 89 Chancery Lane, London, W. C.

Gratis and post free, "The Inventor's Manual," also a pamphlet, "L'Obtention de Patentes Anglaises," 500 Mechanical Movements; the first part of Kinematics, or the Transformation of Motion, by Joseph Willcock, C. E., Mem. Soc. of Eng. May be had at the above address, and of any bookseller. Price 2s. 6d.

The second part is approaching completion and will shortly be announced.

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GAS-WORKS ERECTED FOR Cities and Villages. Plans and Specifications furnished for works of any desired capacity, drawings of Retort Settings for Benches of one, two, three or five Retorts.
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THE AUBIN GAS-WORKS CO., OF ALBANY, N. Y., refer to the following Gas-Light Companies using their Works, to prove that Gas stocks can pay handsomely, and yet a rich and *cheap* Gas be made, viz.: Plattsburgh, Whitehall, Palmyra, Waterford, Bath, Amsterdam, Fort Plain, N. Y.; Rutland, Vt.; Flemington, N. J.; Smyrna and Dover, Del.; Jersey Shore and Pittston, Penn.; Greensboro and Salem, N. C.; Sorel, St. Hyacinthe, and Point Levi, Canada. Agents wanted to extend the sale of the Aubin Portable Gas-Works, unsurpassed for simplicity, safety and economy.

WOODEN PURIFYING TRAYS.

WOODEN TRAYS FOR GAS-PURIFIERS.—The subscriber manufactures the WOODEN TRAYS for GAS-PURIFIERS on the invention of Wm. Combe, *cut from solid wood*, which are found superior to the iron plates formerly used, as being cheaper and more durable. The public are cautioned against the statements of R. G. Hunt, saying he has a patent for the selve itself, published in the AMERICAN GAS-LIGHT JOURNAL, as wholly without foundation. The following letter is from the Commissioner of Patents:

U. S. Patent Office, Jan. 6th, 1862.

Sir—In the matter of interference between the application of Hunt and Combe for patent conically slotted wooden gas-purifiers, appealed from the decision of the Examiner, the Examiners-in-Chief have rendered a decision, bearing date Jan. 4th, 1862. *The Examiners-in-Chief affirm the decision of the Examiner rejecting the first claim of Rich'd G. Hunt, and reverse the decision of the Examiner, rejecting the application of Wm. Combe, assigned to N. O. Hawxhurst.*

Unless an appeal shall be taken from this decision of the Examiners-in-Chief within the next ensuing thirty days, a patent will be allowed to N. O. Hawxhurst, assignee of Combe.

Respectfully, D. P. HOLLOWAY,
Com. of Patents.

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CONICALLY SLOTTED SOLID Wood Trays for Gas-Purifiers.—Admitted to be the best, cheapest, and most durable selves for gas-purifiers ever used.

Secured by Letters Patent of the United States, both for the machinery used in the manufacture, and for the selve itself.

For sale on reasonable terms to Gas-Light Companies or Agents, on application, by letter, to the patentee,
RICHARD G. HUNT,
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New York City.

N. B.—All persons are warned against purchasing these selves of others who falsely pretend to have patents for them. Suits will be commenced immediately against all persons infringing my patents by using or making wooden sleves, but those who hereafter purchase from me can buy their selves cheap and will not be troubled by me on account of former purchases. R. G. H.